

Vol. 29, Part 3

Abstracts No. 983-1579

September 1960

# HELMINTHOLOGICAL ABSTRACTS

*A quarterly review of world literature on helminths and their vectors especially in relation to veterinary, medical and plant pathology, soil science, fisheries, fresh-water and marine zoology, taxonomy and geographical distribution.*



*Prepared by the*

COMMONWEALTH BUREAU OF HELMINTHOLOGY

THE WHITE HOUSE, 103 ST. PETER'S STREET, ST. ALBANS, HERTS,  
ENGLAND

*Published by the*

COMMONWEALTH AGRICULTURAL BUREAUX, FARNHAM ROYAL, BUCKS, ENGLAND



# COMMONWEALTH AGRICULTURAL BUREAUX

Farnham House, Farnham Royal  
Bucks, England

The Commonwealth Agricultural Bureaux organization was formed in 1929 as the Imperial Agricultural Bureaux to administer eight bureaux organized to act as clearing houses of information on research in eight specialized fields of agricultural science. It was expanded at later conferences and now consists of three institutes and ten bureaux, under the general supervision of an Executive Council composed of one representative of each of the contributing governments and financed by a common fund provided by Commonwealth Governments, the Republic of Ireland and the Republic of Sudan.

## EXECUTIVE COUNCIL

A. Perera ( <i>Chairman</i> )	Ceylon
C. K. Reheem ( <i>Vice-Chairman</i> )	Pakistan
W. G. Alexander, C.B.E.	United Kingdom
J. G. Malloch, M.B.E., Ph.D.	Canada
E. J. Drake	Australia
V. Armstrong, Ph.D.	New Zealand
J. H. Brooks	Union of South Africa
S. Krishnamurti	India
W. W. K. Vanderpuye	Ghana
J. D. de Silva	Federation of Malaya
J. E. C. Coventry	Federation of Rhodesia and Nyasaland
C. E. Lambert, C.M.G.	Colonial Territories

Sir Herbert Howard, *Secretary*

E. L. Hay, M.B.E., *Assistant Secretary*

---

## COMMONWEALTH AGRICULTURAL BUREAUX LIAISON OFFICERS

- UNITED KINGDOM. W. Ness, C.B.E., Agricultural Research Council, Cunard Building, 15 Regent Street, London, S.W.1.
- CANADA. H. L. Trueman, B.S.A., Foreign Agricultural Relations Officer, Department of Agriculture, Ottawa, Canada.
- AUSTRALIA. W. Ives, M.Ec., Commonwealth Scientific and Industrial Research Organisation, 314 Albert Street, East Melbourne, C.2., Victoria, Australia.
- NEW ZEALAND. N. A. Marris, M.Sc., Department of Scientific and Industrial Research, Information Bureau, P.O. Box 8018, Government Buildings, Wellington C.1., New Zealand.
- UNION OF SOUTH AFRICA. Dr. S. J. du Plessis, Department of Agricultural Technical Services, Private Bag 116, Pretoria, Transvaal, Union of South Africa.
- INDIA. M. S. Randhawa, D.Sc., F.N.I., I.C.S., Vice-President, Indian Council of Agricultural Research, Multistoreyed Building, Queen Victoria Road, New Delhi, India.
- PAKISTAN. Taskhir Ahmad, Ph.D. (Cantab.), Director, Department of Plant Protection, Government of Pakistan, Karachi, Pakistan.
- CEYLON. R. W. Wikramanayake, C.C.S., Assistant Secretary to Government, Ministry of Agriculture and Food, Colombo, Ceylon.
- GHANA. The Principal Secretary, Ministry of Agriculture, P.O. Box M.37, Accra, Ghana.
- FEDERATION OF MALAYA. Secretary to the Ministry of Agriculture, Swettenham Road, Kuala Lumpur.
- FEDERATION OF RHODESIA AND NYASALAND. G. R. Bates, Ph.D. (Lond.), Chief Botanist and Plant Pathologist, Department of Research and Specialist Services, P.O. Box 8100, Causeway, Southern Rhodesia.
- COLONIAL TERRITORIES. Sir G. W. Nye, K.C.M.G., O.B.E., B.Sc. (Agr.), C.D.A., Agricultural Adviser to the Secretary of State, Colonial Office, Sanctuary Buildings, Great Smith Street, London, S.W.1.
- REPUBLIC OF THE SUDAN. Chief, Agricultural Research Division, Ministry of Agriculture, Wad Medani, Republic of the Sudan.
- REPUBLIC OF IRELAND. M. O'Doherty, Department of Agriculture, (Economics Division), Dublin, Republic of Ireland.



# COMMONWEALTH BUREAU OF HELMINTHOLOGY

The White House  
103 St. Peter's Street  
St. Albans, Herts, England

*Director:*

J. M. Watson, D.Sc.(Lond.), A.R.C.S.

*Assistant Director:*

Sheila M. Willmott, Ph.D.

*Scientific Assistants:*

W. M. Fitzsimmons, F.R.C.V.S.,  
Dip. Agric. (Stellenbosch), Dip. Trop. Med.(Antwerp)  
N. Jones, Grd. és Sc. Agr.(Louvain)  
Miss G. I. Pozniak

The Bureau deals with the biology, systematics, diagnosis, pathology, treatment and control of helminths with special reference to forms parasitic in man and in domestic and wild animals, and to forms harmful to cultivated plants and related species occurring in soils or water. It also covers the biology of molluscan, arthropod and other vectors of helminth infections.

It scans the world literature for articles on helminthological subjects; abstracts those articles which appear to embody facts of importance in helminthology; and publishes the results of these activities in its quarterly journal.

From time to time the Bureau issues occasional publications of a non-periodical nature. These are of two kinds:

- (a) *Technical Communications* which embody the results of recent advances in a manner useful to research workers.
- (b) *Digests*, a new series of publications, in which it is proposed to present information concerning recent advances in the application of research to the practical treatment and control of helminthic diseases of man, domestic animals, fish, and crop plants in a manner useful to the medical man, the public health worker, the veterinarian, the fishery officer, the farmer and the nurseryman.

A special function of the Bureau is the identification of helminthological material, particularly specimens sent by overseas workers to whom local facilities are not available. For this purpose it maintains a Taxonomic Unit. It provides laboratory and library facilities and technical help to scientists of the Commonwealth countries who wish to continue or complete their helminthological investigations while visiting the United Kingdom.

In approved cases the Bureau also prepares bibliographies on helminthological subjects; answers queries on helminthological problems; supplies microfilm and photostat copies of helminthological articles to those without access to the originals; and acts as a liaison centre for putting helminthologists working on similar problems in different parts of the world in touch with each other.

The Bureau does not undertake the preparation of translations from helminthological articles or books in foreign languages; but is prepared to make arrangements to get translations made at the expense of the inquirer.

## EXTERNAL ABSTRACTING PANEL

*Australia:*

H. McL. Gordon, B.V.Sc.  
 R. F. Riek, M.Sc., B.V.Sc.  
 F. H. S. Roberts, D.Sc.  
 Professor W. P. Rogers, M.Sc. (W.A.),  
 D.Sc. (Lond.), F.A.A.  
 R. I. Sommerville, M.Sc.Agr.  
 Professor J. F. A. Sprent, D.Sc., Ph.D.,  
 M.R.C.V.S.

*British Cameroons:*

P. Williams, M.Sc. (Nottingham).

*British Guiana:*

C. P. Kennard.  
 G. D. Paine, M.R.C.V.S.,  
 D.V.T.M. (Edin.).

*Canada:*

Professor E. I. Sillman, B.Sc. (Bucknell),  
 M.A., Ph.D. (Mich.).  
 Gloria A. Webster, B.A. (Conn.),  
 Ph.D. (McGill).  
 H. E. Welch, B.Sc., Ph.D.

*Japan:*

M. Ichinohe.  
 Professor Y. Yamao, D.Sc., M.D.  
 M. Yoshida, Ph.D.

*Kenya:*

G. Froyd, M.R.C.V.S.  
 G. M. Urquhart, Ph.D., M.R.C.V.S.  
 J. A. Dinnik, D.Sc.

*New Zealand:*

R. V. Brunsdon, M.Sc. (Hons.),  
 Ph.D. (N.Z.).  
 P. C. Bull, M.Sc. (N.Z.).  
 M. A. Gemmell, B.V.Sc. (Syd.).  
 H. Jacks, Ph.D. (Lond.), D.I.C.,  
 M.Agr.Sc., Ing.Agron.Dip.Ed.,  
 Dip.Admin.  
 Professor L. R. Richardson, M.Sc.,  
 Ph.D. (McGill), F.R.S.N.Z.  
 G. K. Sweatman, M.A., Ph.D.  
 P. L. Thomas, B.Sc.  
 L. K. Whitten, B.V.Sc. (Syd.),  
 Ph.D. (McGill).

*Pakistan:*

M. M. Sarwar, L.V.P., B.V.Sc., Ph.D.  
 Reverend R. W. Timm, C.S.C., A.B.,  
 M.S., Ph.D.

*Republic of Ireland:*

C. Hatch, M.S. (Iowa), M.R.C.V.S.

*Southern Rhodesia:*

Mary Beverley-Burton, B.Sc., Ph.D.,  
 D.I.C.  
 G. C. Martin.  
 D. F. Mettrick, B.Sc., Ph.D.

*Sweden:*

S. Bingefors, Agr.dr.

*Tanganyika:*

R. W. Butler, B.V.Sc., D.A.P.K.

*Turkey:*

T. Öden, B.Sc.

*Uganda:*

T. J. Coyle, M.R.C.V.S.  
 Winfrith A. F. Webber, Ph.D.

*United Kingdom:*

Erna Bennett, B.Sc.  
 Professor J. J. C. Buckley, D.Sc.  
 H. D. Crofton, B.Sc., Ph.D.  
 C. C. Doncaster, B.Sc. (Wales).  
 W. K. Dunscombe, M.D., M.R.C.S.,  
 L.R.C.P., D.P.H., D.T.M. & H.  
 A. E. Fountain, B.A. (Lond.).  
 M. T. Franklin, Ph.D. (Lond.).  
 J. B. Goodey, B.Sc., Ph.D. (Lond.).  
 L. G. Goodwin, M.B., B.S., B.Pharm.,  
 B.Sc.  
 Kathleen R. Heath, B.Sc.  
 J. J. Hesling, B.Sc. (Lond.), A.R.C.S.  
 D. J. Hooper.  
 W. G. Inglis, B.Sc., Ph.D., F.L.S.  
 B. L. James, B.Sc. (Wales).  
 F. G. W. Jones, M.A. (Cantab.).  
 J. E. D. Keeling, B.Sc.  
 P. Knight, B.Sc. (Lond.).  
 G. Lapage, M.D., M.A., M.Sc.  
 Professor R. T. Leiper, C.M.G., M.D.,  
 D.Sc., LL.D., F.R.C.P., F.R.S.  
 June Mahon, D.Sc. (Neuch.), B.Sc.  
 (Lond.), A.R.C.S.  
 Mary W. McKenzie, B.Sc., A.R.C.S.  
 I. L. Owen, B.Sc.  
 J. E. Peachey, Ph.D. (Dunelm.).  
 C. Rayski, Ph.D., M.R.C.V.S.  
 D. L. H. Robinson, B.Sc. (Wales),  
 Ph.D. (Lond.).  
 Audrey M. Shepherd, Ph.D. (Lond.).  
 O. D. Standen, D.Sc.  
 I. Szladits, Ph.D.  
 E. L. Taylor, C.B.E., D.V.Sc.,  
 M.R.C.V.S., D.V.H., N.D.A., N.D.D.  
 H. R. Wallace, Ph.D. (Liv.).  
 Elizabeth Widdowson.  
 H. H. Williams, B.Sc., Ph.D. (Wales).  
 I. Williams, B.Sc., Ph.D.  
 R. D. Winslow, Ph.D. (Cantab.).  
 C. A. Wright, Ph.D., D.I.C., B.Sc.,  
 A.R.C.S.  
 L. S. Yeh, Ph.D. (Lond.).



## LIST OF PUBLICATIONS

(Obtainable from Commonwealth Agricultural Bureaux, Central Sales Branch, Farnham Royal, Bucks England).

### Helminthological Abstracts

Annual subscription, vol. 29, 1960 (including indices)	(\$7.70)	55s. 0d.
Single parts and annual indices	(\$1.90)	13s. 6d.
Back volumes 1 (1932) to 28 (1959) per volume	(\$7.70)	55s. 0d.

Subscribers (other than trade) resident in the British Commonwealth or the Republics of Sudan and Ireland are allowed a special discount of 20 per cent on annual subscriptions to current volumes provided they order direct from the Central Sales Branch at the above address.

### Technical Communications

4. The Root-infesting Eelworms of the Genus <i>Heterodera</i> . Bibliography and Host-list. (1931)	(\$1.80)	12s. 0d.
15. The Bursate Lungworms of Domesticated Animals. T. W. M. Cameron. (1933)	(\$1.50)	10s. 0d.
16. Recent Researches on Helminth Immunity. Phyllis A. Clapham. (1933)	(\$0.90)	6s. 0d.
18. The Pathology and Aetiology of Plant Lesions caused by Parasitic Nematodes. T. Goodey. (1939)	(\$1.50)	10s. 0d.
23. Helminth Parasites of Australia. May R. Young. (1939)	(\$3.10)	20s. 6d.
26. Bibliography of Phenothiazine as an Anthelmintic. (1942)	(\$0.30)	2s. 0d.
29. The Cyst-forming Species of <i>Heterodera</i> . (1951). Mary T. Franklin. Illustrated cloth	(\$2.80)	18s. 6d.
30. The Nematode Parasites of Plants Catalogued Under their Hosts. T. Goodey, J. B. Goodey and Mary T. Franklin. 2nd edition revised (1956)	(\$4.20)	27s. 6d.
Supplement only. 1959.	(\$1.20)	7s. 6d.
31. Plants Recorded as Resistant to Root-Knot Nematodes ( <i>Meloidogyne</i> spp.) Mary T. Franklin and D. J. Hooper	(\$1.20)	7s. 6d.
Ecology of the Free-living Stages of the Nematode Parasites of Sheep in relation to Flock Behaviour and Population Dynamics in Host and Parasite. H. D. Crofton.		In preparation
Proprietary and Chemical Names of Anthelmintic Preparations. Sheila M. Willmott.		In preparation
Pathogenesis of Helminthiasis. G. Lapage.		In preparation
Factors Affecting Emergence of Larvae of the Genus <i>Heterodera</i> from their Cysts. A. M. Shepherd.		In preparation

### Digests

Nematicides. J. Peachey.	In preparation
Veterinary Anthelmintic Medication. T. E. Gibson.	In preparation

## EDITORIAL NOTICES

### Reprints

The Editor would be glad to receive reprints of helminthological articles as soon as possible after their issue in order that abstracts of them may be printed without delay.

### Reports

Departmental and other reports in which helminthological matters are mentioned should be sent to the Editor as soon as they are published in order that prompt notice of them may appear in *Helminthological Abstracts*.

### Books for Review

The Editor will be glad to receive for review books relating to any branch of helminthology. Volumes in which helminthological subjects form only a part of a cognate whole are as welcome as those devoted exclusively to helminthology. Publishers are reminded of the world-wide circulation of *Helminthological Abstracts* among workers in this field.

### News Items

Readers are invited to submit to the Editor items of news likely to be of interest to helminthologists.

## PHOTOCOPIES AND MICROFILMS

In order to assist readers in obtaining copies of original articles or extracts therefrom which would otherwise be inaccessible to them, the Bureau offers the following services:

### Photocopies

Dispatched by ordinary mail, post-free, 9d. per page.

Minimum charge 1s. 6d. per order.

Dispatched by airmail, post-free, 1s. 0d. per page.

Minimum charge 2s. 0d. per order.

### Microfilms

Dispatched by ordinary mail, post-free, 2d. per page.

Minimum charge 2s. 6d. per order.

Dispatched by airmail—postage extra.

These prices apply regardless of the size of page.

Orders can only be accepted on the following conditions:

(1) That full and accurate information concerning the extract or article required is provided, including Name of Author (or Authors), Date of Publication, Title of Paper, Name of Journal (in full), Volume number, Part number and Page numbers.

(2) that the order includes a signed declaration that the photographic copy is required for the purpose of private study, research, criticism or review, and that the recipient undertakes not to sell or reproduce it.

An account will be rendered by the Bureau on completion of the work.

Special order forms may be obtained from the Bureau.

Since considerable time is often involved in obtaining the necessary journals when they are not available in the Bureau Library, some delay in the dispatch of photographic copies may be inevitable.



# LIST OF CONTENTS

v

PAGE

<b>Review Article</b> . . . . .	<b>235</b>
<b>Book Reviews</b> . . . . .	<b>236</b>
<b>Film Review</b> . . . . .	<b>238</b>
<b>Summary of Reports</b> . . . . .	<b>239</b>

## ABSTRACTS

<b>MEDICAL HELMINTHOLOGY</b>	<b>PAGE</b>		
Surveys . . . Nos. 983-990	<b>241</b>	Nematoda parasitic in other invertebrates . . .	<b>*nil 295</b>
Trematoda . . . Nos. 991-1035	<b>242</b>	Control . . . Nos. 1310-1319	<b>295</b>
Cestoda . . . Nos. 1036-1057	<b>250</b>	Miscellaneous . . . Nos. 1320-1321	<b>297</b>
Acanthocephala . . . nil		<b>TAXONOMY</b>	
Nematoda . . . Nos. 1058-1129	<b>252</b>	Monogenea . . . No. 1322	<b>297</b>
Nematomorpha . . . nil		Aspidobothria . . . nil	
Hirudinea . . . Nos. 1130-1131	<b>263</b>	Digenea . . . Nos. 1323-1335	<b>298</b>
Pentastomida . . . No. 1132	<b>263</b>	Cestodaria . . . nil	
Miscellaneous . . . Nos. 1133-1138	<b>263</b>	Cestoda . . . Nos. 1336-1342	<b>301</b>
<b>VETERINARY HELMINTHOLOGY</b>		Acanthocephala . . . Nos. 1343-1345	<b>303</b>
Horses, Donkeys		Nematoda . . . Nos. 1346-1383	<b>304</b>
and Mules . . . Nos. 1139-1143	<b>264</b>	Nematomorpha . . . nil	
Cattle . . . Nos. 1144-1159	<b>265</b>	Hirudinea . . . nil	
Sheep and Goats . . . Nos. 1160-1181	<b>268</b>	Pentastomida . . . No. 1384	<b>312</b>
Pigs (Swine) . . . Nos. 1182-1189	<b>272</b>	Miscellaneous . . . *nil	<b>312</b>
Elephants . . . *nil	<b>273</b>	<b>INVERTEBRATE INTERMEDIATE HOSTS</b>	
Camels and Llamas . . . nil		Arthropoda . . . Nos. 1385-1390	<b>312</b>
Rabbits and Hares . . . No. 1190	<b>273</b>	Mollusca . . . Nos. 1391-1399	<b>314</b>
Cats and Dogs . . . Nos. 1191-1202	<b>274</b>	Control . . . Nos. 1400-1408	<b>316</b>
Fur-bearing		Miscellaneous . . . *nil	<b>317</b>
Animals . . . No. 1203	<b>275</b>	<b>GENERAL HELMINTHOLOGY</b>	
Laboratory		Technique . . . Nos. 1409-1429	<b>317</b>
Animals . . . Nos. 1204-1209	<b>275</b>	Geographical	
Poultry . . . Nos. 1210-1220	<b>276</b>	Distribution . . . Nos. 1430-1442	<b>321</b>
Other Mammals . . . *nil	<b>278</b>	Cytology and	
Other Birds . . . Nos. 1221-1224	<b>278</b>	Genetics . . . Nos. 1443-1444	<b>324</b>
Reptiles and		Morphology, Anatomy and	
Amphibia . . . *nil	<b>279</b>	Histology . . . Nos. 1445-1458	<b>325</b>
Miscellaneous . . . Nos. 1225-1243	<b>279</b>	Life-cycle and	
<b>FISHERIES HELMINTHOLOGY</b>		Development . . . Nos. 1459-1483	<b>328</b>
Fresh-water . . . Nos. 1244-1251	<b>282</b>	Bionomics . . . Nos. 1484-1517	<b>333</b>
Marine . . . No. 1252	<b>284</b>	Pathogenesis . . . Nos. 1518-1537	<b>341</b>
Miscellaneous . . . No. 1253	<b>284</b>	Immunity . . . Nos. 1538-1554	<b>344</b>
<b>NEMATOLOGY</b>		Anthelmintics . . . Nos. 1555-1571	<b>349</b>
Free-living		Economic aspects . . . No. 1572	<b>352</b>
Nematoda . . . Nos. 1254-1256	<b>284</b>	History . . . No. 1573	<b>353</b>
Plant-parasitic		Biography . . . nil	
Nematoda . . . Nos. 1257-1309	<b>285</b>	Hyperparasitism . . . Nos. 1574-1576	<b>353</b>
Insect-parasitic		Evolution . . . Nos. 1577-1579	<b>353</b>
Nematoda . . . *nil	<b>295</b>	Miscellaneous . . . nil	
<b>News and Notes</b> . . . . .			<b>vii</b>
<b>Reports of Meetings</b> . . . . .			<b>vii</b>
<b>Programmes and Personnel</b> . . . . .			<b>viii</b>
<b>Movements of Helminthologists</b> . . . . .			<b>ix</b>

\* But see for cross references.

## TAXONOMY UNIT

In view of the need for taxonomic and identification services in helminthology, a Taxonomy Unit has now been established within the Bureau. The services provided include:

- (a) Assistance in the identification of helminthological specimens in co-operation with specialists in the United Kingdom and other countries.
- (b) Creation of reference collections available for exchange and distribution.
- (c) Encouragement and assistance in local surveys.
- (d) Provision of laboratory and library facilities and technical help to scientists of the Commonwealth countries who wish to continue or complete their helminthological investigations while visiting the United Kingdom.
- (e) The compilation of a modern authoritative work of reference.

Overseas workers to whom local facilities are not available are invited to submit their helminthological material for identification. Since badly fixed specimens are often unidentifiable, it is essential that all such specimens should be adequate in this respect. Advice on methods of fixation and preservation will be supplied on request.

## ADVISORY SERVICE

The Bureau is always pleased to render an opinion or give assistance in connection with any helminthological matter submitted to it.

## Recent Publications of the COMMONWEALTH BUREAU OF HELMINTHOLOGY

- T. C. 30a. "Supplement to the Nematode Parasites of Plants Catalogued under their Hosts. 1955-1958"  
by J. Basil Goodey, Ph.D., Mary T. Franklin, Ph.D. and David J. Hooper  
66 pp. Price 7/6 (\$1.20)
- T. C. 31. "Plants Recorded as Resistant to Root-Knot Nematodes  
(*Meloidogyne* spp.)"  
by Mary T. Franklin, Ph.D. and David J. Hooper  
33 pp. Price 7/6 (\$1.20)

Orders for these publications can be placed with any major bookseller or sent to:

COMMONWEALTH AGRICULTURAL BUREAUX,  
CENTRAL SALES BRANCH, FARNHAM ROYAL, BUCKS, ENGLAND



# HELMINTHOLOGICAL ABSTRACTS

Vol. 29, Part 3

## REVIEW ARTICLE

### The Role of the Taxonomist

In recent years there has been a considerable resurgence in the study of taxonomy in most groups of the animal kingdom, following the realization that to know exactly what animal is under study is of fundamental importance whether it is its behaviour patterns, the diseases it causes or its relation to other members of the animal kingdom.

In helminthology, as in other branches of zoology, the role of the taxonomist is to determine the correct scientific name according to current internationally accepted rules, not only of the parasitic but also of the free-living helminths, in order to give precision to the findings of the clinician and the pathologist in their investigations of diseases of plants and animals and particularly of those of economic importance.

He has not only to identify those stages causing disease but to distinguish them morphologically from related forms and to recognize their developmental stages in order to give precision to the efforts of the hygienist to prevent infection. This involves the differentiation and identification not only of the various free-living larval stages of related parasitic forms from one another but also those from the larval stages of free-living species. Such precision in diagnosis is also essential as a guide to those investigating by experiment the immunological reactions of the hosts, and the effect of drugs on the parasites.

The naming of helminths dates from the 10th Edition of Linnaeus' *Systema Naturae* (1758), but since then the rules of nomenclature have changed from time to time. To ascertain the correct name today requires an extensive search of the literature and a knowledge of those earlier rules which have been replaced, as many of the parasitic helminths of man and animals live also in other animals in which they were originally differently named. The determination of the correct name today requires a detailed search over a wide range of zoological literature and a knowledge of the changes in names resulting from the alterations in nomenclatural rules and the incidence of the law of priority which now requires that the name adopted should be the earliest name published. This applies of course not only to the helminths but also to the names of their various vectors and an acquaintance with the relevant literature on these vectors is therefore also essential.

In order to name a helminth then, the systematist must know the anatomy and life-history of the members of the group in which he specializes. He must also have access to the published literature on the group so that he can make comparisons. This literature is vast and spread over such a diversity of journals, periodicals and books, that it is rarely easily accessible except in a few of the larger library centres of the world. He must be familiar with highly specialized techniques necessary for the study of nearly all categories of helminths.

The way in which the study of helminth taxonomy can make contributions to the study of plant pathology, medical and veterinary science, and evolution can be illustrated by the following examples.

In the field of plant nematology the studies of the taxonomist have had a direct bearing on advances in practical control measures. Thus, for example, the work of Franklin (1940) on



the specific status of the so-called biological strains of *Heterodera schachtii* demonstrated that they could be separated on a morphological basis as well. The knowledge that different and host-specific species of a genus were involved and not merely varieties of a species lent strength to the hypothesis that there was little danger of transfer by readaptation from one host crop to another as there might have been reason to fear had varieties only been involved. This hypothesis has been borne out in practice. A further practical contribution that this work has made is that it is now often possible to ascertain from a soil sample which species of *Heterodera* is present and therefore which crop can be grown safely on otherwise sick land.

The accurate identification of parasites in wild and domesticated animals is of immense importance to the medical and veterinary hygienist. That the comparative morphology of parasites from a wide range of hosts is of value is well illustrated by the classical story of *Trichinella spiralis* as written by Reinhard (1958). First noted in human cadavers by James Paget its immature form was described and named by Richard Owen in 1835; it was later more fully described by Farre, Luschka and others. Leidy (1846) was the first to record it from the pig and concluded that it was identical with the specimens he had met with from humans. Unfortunately the comparative work of Leidy did not receive the attention it deserved. If his correct observations had been accepted at the time it might not have taken another 14 years before the riddle of the chief source of human infection was solved by Virchow & Zenker in 1860.

A summary of speculations which may be made on the evolution of modern vertebrates by a study of their parasites is given by Cameron (1956). Among several examples given he points out that the protozoon genus *Plasmodium* occurs in reptiles, birds, insectivores, numerous primates, and occasionally in rodents, but, apart from a few obvious cases, it occurs in no other mammals. Similarly in the Nematoda, the Oxyuridae are confined to primates, rodents, reptiles and amphibians with two very specialized genera in American opossums and cobegos and with the exception of those found in arthropods and the plainly erratic species in equines. This would seem to suggest that these originally reptilian parasites were able to survive in mammals only in that stem which led to the modern primates. Their presence in rodents suggests that the latter may have originated in the same stem. Cameron further points out that comparative parasitology is still in its infancy and that better and more accurate morphological studies are needed to enable more definite hypotheses to be formulated.

Such studies help to direct attention to the value of true taxonomy and to stress the importance of an ordered connection of all branches of biological science.

## BOOK REVIEWS

BLANCHARD, J. R. & OSTVOLD, H., 1958. [University of California, Davis, Calif., U.S.A.] "Literature of agricultural research." **Berkeley: University of California Press**, x+231 pp.

The compilation of a work of this kind and the classification of authors and subjects which it involves, although so valuable when done, is so tiresome to get together that one is only left wondering at the diligence of those who do such work. This volume will be particularly useful in guiding those in search of information to the dictionaries, encyclopaedias, text-books, directories, bibliographies and abstracting journals where it may be found. It shows the inquirer how to start looking, and is the sort of book which should always be at hand. Nevertheless, in the particular field of helminthology, it is not as helpful as one might wish. Particularly is this the case with respect to plant nematology, none of the periodicals or bulletins in use in that branch of agricultural science being mentioned. **Helminthological Abstracts**, mentioned only in connection with "Economic Zoology", should have been listed not only under "Plant Pathology" and "Veterinary Medicine" but also under "Fisheries" since it deals with research literature relevant to all three fields. It is to be hoped that in the next edition of this excellent work these omissions will be put right.

J. M. Watson



BRITISH VETERINARY ASSOCIATION, 1959. [7 Mansfield Street, London, W.1.] "Parasitic diseases of cattle." **London: British Veterinary Association**, 2nd edit., 74 pp.

Nearly the first half of this second edition is devoted to the helminthiasis of cattle. This section is divided under the following headings: Parasitic gastro-enteritis, Parasitic bronchitis and Fascioliasis. Information under these headings is given on the causal parasites, symptoms, post-mortem appearances, diagnosis, epidemiology, treatment and control. A new section has been added on the ecology of *Lymnaea truncatula* linking it with the epidemiology of fascioliasis. This is the outcome of work in progress at the present time and gives a logical explanation for many observed occurrences in connection with this disease. It provides a basis for forecasting such as may enable practising veterinary surgeons to warn their clients of coming outbreaks for which they should prepare.

W. M. Fitzsimmons

SEINHORST, J. W., 1957. [Institute voor Phytopathology, Wageningen, Netherlands.] "Phytonematology in Western Europe." **Auburn, Ala: Technical Committee, Southern Regional Nematology Project**, 39 pp. [Mimeographed.]

This booklet is an assessment of plant nematode problems in Western Europe. Aspects of nematology which do not appear in text-books or monographs are given most consideration. The more important plant nematodes, *Heterodera* spp., *Ditylenchus dipsaci*, *Pratylenchus* spp., *Hoplolaimus uniformis* and *Paratylenchus* spp. are briefly discussed. Control of nematode diseases in Europe by chemical treatment, breeding resistant varieties of plants and by crop rotation is also described. The population dynamics of soil nematodes is also considered and Seinhorst concludes that there are two major groups: (i) those whose population numbers are influenced to a great extent by crop rotation, e.g. *Heterodera* spp. and (ii) those which are relatively independent of crop rotation for their persistence in the soil, e.g. *Ditylenchus dipsaci*, *Pratylenchus* spp. and *Hoplolaimus uniformis*. He suggests that in order to evaluate the importance of a plant nematode it is necessary to know the level of the soil population at which damage occurs and in what parts of the distributional area such infestations are likely to build up under cropping practices favourable to the nematode. There is a final section on methods for quantitative investigations of *Heterodera* populations.

H. R. Wallace

SMITH, H. A. & JONES, T. C., 1957. "Veterinary pathology." **London: Henry Kimpton**, 959 pp.

This comprehensive account of veterinary pathology begins with chapters on cellular degenerations, mineral deposits, pigments, disturbances of growth and circulation, inflammation and body reactions and the causes and nature of disease. Succeeding chapters discuss in greater detail the various groups of aetiological factors and agents, including parasitic helminths. The remaining chapters deal with diseases of the various systems of the body. At the end of each chapter there is a brief bibliography. The book is attractively produced and is printed in clear and well arranged type. It is illustrated by 263 excellent photographs, many of which are remarkable and should be of much value to the reader.

G. Lapage

WATSON, J. M., 1960. [Commonwealth Bureau of Helminthology, 103 St. Peter's Street, St. Albans, Herts, U.K.] "Medical Helminthology." **London: Baillière, Tindall & Cox, Ltd.**, xi+487 pp.

This is a large book of nearly 500 pages, 62 of which are devoted to illustrations which total over 600 individual drawings. There are also numerous tables, presenting useful information in a convenient way. The book is divided into three parts—I General Introduction, II Systematic Account of the Helminths Parasitic in Man, and III Clinical and Public Health Aspects of Helminthic Infections.

In Part I there are eleven chapters. These begin with an Historical Review which is a well written account of the subject of helminthic disease in man from the time of the Ebers Papyrus (about 1550 B.C.), through the Middle Ages, up to the beginning of the modern epoch

(16th to 19th century) when rapid advances were made in classification of helminths and in investigations of their development. Subsequent chapters in Part I deal in a general way with aspects of helminthic parasites such as life-cycles, physiology, ecology, transmission, immunology, pathology, distribution and evolution. They are treated in a well-informed and thorough manner and form an important part of the reading matter of the book. Students of helminthology and others will derive much benefit from this section.

In the Systematic Account (Part II) which probably forms the most used part of a book of this nature, there has been a departure from the orthodox method of presentation which is influenced by considerations of clinical convenience. Instead of following a zoological sequence the parasites are grouped according to the location of the pathogenic stages in the human body. Thus the Nematodes and Cestodes are each separated into two groups, those occurring in the intestine and those in the tissues. The Trematodes are in five groups, from respectively the alimentary tract, liver, lungs, circulatory system and skin. The method has much to recommend it but also has its disadvantages, the chief one of the latter being its unfamiliarity which, until one becomes used to it, makes the search for a certain piece of information a little more difficult. However, once the new format is grasped, the information is always to be found and is authoritative and accurate, with a few minor exceptions. The illustrations, in black and white, which are so important in any systematic account of this kind, are numerous and mostly well executed, but the standard is somewhat uneven. A small number are lacking in clarity and even accuracy; moreover, in the reviewer's opinion, illustrations of pathological sections of helminth-infected tissues or organs should be reproduced as photographs, not as drawings. In a text-book of this high quality the extra expense necessary is well merited.

Part II concludes with accounts of the thorny headed worms, the leeches and tongue-worms. This group, which contains forms which are not strictly speaking "helminths" is made complete by an account of the hairworms in Appendix D.

Laboratory procedures and techniques in the diagnosis of helminthic infections are very competently dealt with in Part III, and the same chapter includes a table concerning differential diagnosis. Arthropod and molluscan intermediate hosts of helminths and methods of collecting and examining them are described later. Part III concludes with a valuable chapter on treatment of helminthic infections and a brief account of the principles of prevention.

The writing of this book was begun in 1952, since when, as the writer points out, considerable advances have been made in all branches of helminthology and should be included in the interests of accuracy and completeness. This is carried out in Appendix E. It is an unusual but praiseworthy feature in a text-book and yet another example of the thoroughness which is evident throughout the work.

Dr. Watson is to be congratulated on his achievement and his publishers for the manner in which it has been executed.

J. J. C. Buckley

## FILM REVIEWS

At the Eighth Annual Meeting of the American Society of Tropical Medicine and Hygiene, which was held in Indianapolis last October, a film entitled "Helminthiasis Humana en el Mundo" was shown by Dr. F. H. Aguilar and Dr. C. M. Monson M., Universidad der San Carlos de Guatemala, Guatemala City, Guatemala. It is hoped to publish a review of this film in a later issue of *Helminthological Abstracts*.

New films of helminthological interest appear relatively infrequently. There are, however, a number of excellent films in this field already available. It is hoped, in future issues, to list these films with brief comments.



## SUMMARY OF REPORTS

[Only those sections relating to helminthology are abstracted.]

**AUSTRALIA. "Annual Report of the Queensland Department of Agriculture and Stock, 1958-59."** Brisbane: Government Printer, 106 pp. (Received 13.1.60.)

A state-wide scheme for collecting nematode material for study has been implemented; facilities for research are being arranged. The animal section reports that a survey of liver-fluke in cattle has not, so far, detected any major extension of the known small endemic area. The south-west experienced considerable losses due to *Haemonchus* infections. *Dictyocaulus* in calves occurs in several areas.

G. I. Pozniak

**CANADA. "Annual Report of the Department of Agriculture of the Province of Alberta for the year 1958."** Edmonton: Queen's Printer for Alberta, 211 pp. (Received 7.1.60.)

Lungworms in cattle and sheep have been a continuing problem in certain areas; but cyanacethydrazide has been administered to affected animals with excellent results. Capillariasis has been a primary cause of death or emaciation in a limited number of chicken flocks.

J. M. Watson

**CANADA. "Review of the National Research Council 1959."** Ottawa: National Research Council, 337 pp. (Received 25.1.60.)

The Joint Committee of the Institute of Parasitology reports that activities in 1958 included research on: the life-history of *Porrocaecum decipiens* and the carbohydrate content of its larvae; the intermediary metabolism of *Ascaris lumbricoides* from pigs; new technical methods for the analysis of tissue acids; a study of the taxonomy of hookworms in reptiles; the temperature reactions of some hookworms; the incidence of *Trichinella* in man in the Arctic (it was as high as 95% in some Eskimo tribes); more efficient methods of diagnosis of *T. spiralis* and hydatid cyst infections; the growth of hydatid cysts in artificial media; comparative pathology of hydatid from various animals and parts of the world, and the comparative morphology of the adult worms; and the identification of nematodes and cestodes from North African animals, which it is hoped will be completed next year.

G. I. Pozniak

**INDIA. "Eleventh Annual Report of the Research Department of the Coffee Board, 1957-58."** Balehonnur, South India: Director of Research, Coffee Board, ii+184 pp. (Received 15.1.60.)

A survey of the distribution of eelworms on coffee in South India showed that the infestation prevailed on various estates in the Sakalaspur, Coorg, Wynaad and Pulney zones. *Radopholus similis* and *Tylenchorhynchus* sp. were more widely distributed than *Xiphinema insignis* and *Pratylenchus pratensis*. Non-parasitic eelworms were abundant on all estates. Soil amendment treatments, with or without sulphur, did not significantly affect the eelworm populations. Nematicide V.C.13 considerably reduced their numbers, while trials with Crag fungicide and Nemagon were inconclusive.

G. I. Pozniak

**JAMAICA. "Annual Report of the Ministry of Agriculture and Lands for the year ended 31st December, 1957."** Kingston: Government Printer, 81 pp. (Received 4.2.60.)

*Habronema megastoma* in a horse and *Ascuria* sp.[?] in a parrot were recorded for the first time for Jamaica. *Radopholus* sp. was found for the first time in association with citrus, being present in groves at St. Catherine, Manchester and Portland. *R. similis* caused greater losses among bananas during 1957 than in the past.

G. I. Pozniak

**MAURITIUS. "Annual Report of the Department of Agriculture for the year 1958."** Port Louis: Government Printer, 64 pp. (Received 15.1.60.)

Trials at the Richelieu Experiment Station on the chemical control of diseases in tobacco seed-beds, again demonstrated the nematocidal effect of ethylene dibromide. It is essential that manure mulch, often the source of eelworm infestation, be applied before the treatment, while the most suitable interval between the treatment and sowing is seven days. Other fungicides, viz., methyl bromide, vapam and mylone, are being included in seed-bed trials with promising results. Newer products have the advantage of not requiring special equipment and controlling diseases and weeds as well as nematodes and insects. The Sugar Industry Research Institute reports progress in the study of nematodes occurring in the soil around sugar-cane roots; several new species have been identified.

G. I. Pozniak

**NORTHERN IRELAND, 1959. "Agricultural Entomology Division. Report for 1958." Research and Experimental Record of the Ministry of Agriculture, Northern Ireland, 8 (2), 103-114.**

Research in 1958 included work on the potato-root eelworm, i.e. the resistance of crosses between cultivated potato and resistant *Solanum andigenum* and *S. vernei*, the influence of various cropping systems on the incidence and persistence of infection in the soil, and the incidence of aggressive strains in Northern Ireland, and on the resistance of oats to *Ditylenchus dipsaci*. An investigation into sodium methyldithiocarbamate fumigation of green-house soils showed this treatment to be insufficiently effective. There was a general increase in *Aphelenchoides* infections and the species mentioned include *A. blastophthorus* on narcissus bulbs and *A. saprophilus* on mushroom mycelium. A new mode of feeding of *A. ritzema-bosi* on chrysanthemums, which produced correspondingly different symptoms, was noted.

G. I. Pozniak

**NORTHERN IRELAND, 1959. "Veterinary Research Division. Report for 1958." Research and Experimental Record of the Ministry of Agriculture, Northern Ireland, 8 (2), 197-214.**

Adverse weather conditions resulted, in 1958, in very severe outbreaks of fascioliasis in sheep, early autumn attacks of gastro-enteritis in weaned lambs and prolonged attacks of parasitic bronchitis in some young cattle. The Parasitology and Pathology Laboratory undertook research (i) into the possibility of transfer of *Dictyocaulus viviparus* from cattle to calves and the effect on larval populations of grazing with immune cattle, and (ii) on the effect of mixed *Nematodirus* infections on the weight gain of lambs, the persistence of infection on pasture and the relationship of mixed grazing to the disease. *Trichinella spiralis* was shown to be absent in pigs in Northern Ireland.

G. I. Pozniak



# ABSTRACTS

When an address accompanies an abstract, it is that of the first author.

## MEDICAL HELMINTHOLOGY

### Surveys

See also Nos.: 1011, 1074, 1230.

**983**—DOMINICI, L. M., MICHELONI, F., BIGOTTO, M. R. & PIVA, F., 1958. "Diffusione delle parassitosi intestinali fra la popolazione infantile della Repubblica di San Marino. Considerazioni clinico-epidemiologiche." *Igiene e Sanità Pubblica*, **14** (11/12), 628-644. [English, French & German summaries pp. 628-629.]

Dominici *et al.* examined 2,126 persons, chiefly children, for helminth infection in the Republic of San Marino. 1,313 (61·84%) were positive. The commonest species were *Trichuris trichiura* (45·5%), *Enterobius vermicularis* (27·62%), *Ascaris lumbricoides* (12·1%), *Strongyloides stercoralis* (2·05%) and *Hymenolepis nana* (1·5%). The findings are discussed in relation to age, sex and locality of the subject, and to the general epidemiological background. J. M. Watson

**984**—FELSANI, F., 1959. [Clinica delle Malattie Tropicali e Subtropicali dell'Università di Roma, Italy.] "Osservazioni nosografiche nel bassopiano del Yemen." *Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia*, **40** (5), 239-268. [English, French & German summaries p. 266.]

1,221 faecal samples from the Yemenite lowlands were examined at the hospital of Hodeidah during 1955-57. The incidence of helminthiasis was: *Ascaris lumbricoides* 17·77%; *Trichuris trichiura* 14·5%; *Enterobius vermicularis* 4·33%; *Hymenolepis nana* 5·15%; *Ancylostoma duodenale* 0·24%; *Taenia saginata* 3·93%; and *Schistosoma mansoni* 11·22%. Ascarid infection is frequently associated with other helminthiasis and in particular with *Trichuris trichiura* and *Hymenolepis nana*. Perforation of the duodenum was due in one case to ascarids. Draconitiasis is also very frequent. On the other hand only three cases of hydatid of the liver were observed, probably due to the fact that the people do not keep their dogs in the houses. N. Jones

**985**—JEFFERY, G. M., 1960. [Department of Health, Education and Welfare, Public Health Service, National Institute of Allergy and Infectious Diseases, Laboratory of Parasite Chemotherapy, P.O. Box 717, Columbia, South Carolina, U.S.A.] "A three-year epidemiologic study of intestinal parasites in a selected group of mental patients." *American Journal of Hygiene*, **71** (1), 1-8.

Incidence of parasites was studied over a three-year period in mental patients, 110 for the total duration with nine examinations, and 199 for varying duration with one to eight examinations. The incidence and persistence of hookworms, *Strongyloides stercoralis* and *Trichuris trichiura* are tabulated and discussed. During the early stages of the survey the patients were housed in an old dilapidated hospital; they were then transferred to a new modern building and the implication of improved sanitation studied. Transmission of hookworm ceased and that of *S. stercoralis* and *T. trichiura* was greatly reduced. Hookworm and *T. trichiura* persisted for the three-year period in most cases. [No mention is made of treatment.] N. A. Hancock

**986**—LEITE, G., 1957. [Feira de Santana (Bahia), Brazil.] "Polihelmintíase em lactente de 30 dias de idade. (Provável caso de infestação placentária)." *Revista Brasileira de Medicina*, **14** (9), 625-628. [English summary p. 628.]

Leite has carried out faecal examinations of 164 children less than three years old and found helminth infections in 65% of those in their first year, 93% between one and two years old and 95% between two and three years old. A case of infection with *Ascaris*, *Trichocephalus* and hookworms in a 30-day-old infant is recorded. The child had been breast-fed but had drunk

\* Titles so marked throughout this number have not been seen in the original.

unboiled and unfiltered water from a cistern. After considering the various possible explanations for this case the author concludes that it must be accounted for by trans-placental infection. C. A. Wright

- 987—NAGATY, H. F. & RIFAAT, M. A., 1959. [Department of Parasitology, Faculty of Medicine, Ein-Shams, University of Cairo.] "A helminthological survey of the inhabitants of the village of Barnasht, Giza Province, Egypt, U.A.R." *Journal of the Egyptian Medical Association*, 42 (8), 456–463.

Nagaty & Rifaat found that ancylostomiasis (27·27%) and urinary schistosomiasis (16·93%) were the commonest helminthic infections in the village of Barnasht, Giza, Egypt, both being more prevalent in adolescents and in males. Intestinal schistosomiasis, although indigenous, was uncommon (0·21%). Other prevalent helminthiasis were trichostrongylosis (4·23%), enterobiasis (2·28%—but swab examinations were not performed), hymenolepiasis nana (1·56%) and ascariasis (0·62%). The low incidence of the last-named infection was associated with the fact that vegetables and salads grown locally were sent to Cairo markets and not consumed in the village. Trichuriasis and taeniasis saginata were very rare. The significance of these findings is discussed. J. M. Watson

- 988—NEGhme, A., SILVA, R., GALDAMES, M. & DOREN, G., 1959. [Departamento de Parasitología, Universidad de Chile.] "Ensayo de terapéutica antiparasitaria en masa, de un grupo de asiladas del Hospital Psiquiátrico de Santiago." *Boletín Chileno de Parasitología*, 14 (3), 46–51. [English summary p. 46.]

When faecal examinations were made of 217 women patients and domestic staff at the Psychiatric Hospital of Santiago, Chile, infection with *Ascaris lumbricoides* was found in 53 persons and *Trichuris trichiura* in 161. The patients were living in unhygienic surroundings and because of their mental condition were unable to follow advice on personal hygiene. Each of 66 patients infected with helminths received dithiazanine iodide (3·3' diethylcarbocyanine) at the rate of 600 mg. per day in three daily doses for five days. Faecal examinations conducted ten days, a month and ten days, and a month and 18 days after treatment showed an initial reduction in the incidence of eggs of *A. lumbricoides* and *T. trichiura* but later the incidence began to increase. The side effects were diarrhoea in three patients and vomiting in 11. M. McKenzie

- 989—PESSÔA, S. B., 1957. "Parasitoses intestinais nos dois primeiros anos de vida." *Brasil-Médico*, 71 (44/48), 351–358. [English summary p. 358.]

Pessôa presents the results of a survey of the intestinal parasites of children during the first two years of life in the States of Paraíba and Alagoas, Brazil. The percentage of children under the age of one year with intestinal infections was found to be 66·8% while in children between one and two years the rate was 92·1%. The dominant parasite was *Ascaris* with *Trichocephalus* second, hookworms next and *Strongyloides* and *Schistosoma* about equal last. No excessively heavy infections were found, the greatest being 96,000 *Ascaris* eggs per gramme of faeces. The author suggests that infection of very young children by *Ascaris* may be by air-borne eggs which were found to be very common in the dust. C. A. Wright

- 990—VILLEGAS CANEVARO, O., 1959. "Estudio epidemiológico y parasitológico de la población 'Hospital Norte', Iquique." *Boletín Chileno de Parasitología*, 14 (3), 51–55. [English summary p. 51.]

A faecal survey of 87 persons living in the slum area of Hospital Norte in Iquique in the hot dry region of northern Chile revealed *Trichuris trichiura* in two and *Hymenolepis nana* in 12 persons. M. McKenzie

## Trematoda

See also Nos.: 1206, 1247, 1387, 1388, 1391, 1392, 1393, 1394, 1395, 1396, 1398, 1399, 1405, 1407, 1408, 1421, 1424, 1459, 1469, 1478, 1485, 1511, 1524, 1525, 1531, 1538, 1539, 1546, 1549, 1550, 1552, 1553, 1554, 1566, 1572, 1573.



- \*991—ANON., 1959. [Observations on the therapeutic value of chloroquine and chloroquine combined with emetine in the treatment of 160 cases of paragonimiasis.] **Chinese Journal of Internal Medicine**, 7 (3), 224–231. [In Chinese: English summary p. 20.]  
Results of treatment with chloroquine alone or chloroquine with emetine showed a cure rate of 20·3% in the first group and 90·9% in the latter. In both groups, efficacy of treatment decreased with increasing severity of infection, but there was no marked difference in response among cases of light infection; hence it is concluded that chloroquine alone is effective only for such cases. Severe reactions to the combined drugs are hinted at. [Taken from abstract in **Chin. med. J. Peking**, 78 (4), 384–385.] N. A. Hancock
- 992—ANON., 1959. “Studies on schistosomiasis japonica in New China.” **Chinese Medical Journal. Peking**, 78 (4), 368–379; (5), 461–489.  
The prevalence of schistosomiasis japonica was greatest in west and south China, geographically corresponding with the distribution of its intermediate host, *Oncomelania hupensis*. Types of endemic areas and occupational incidence are classified, and methods of control and eradication of *O. hupensis* are discussed, as well as ovicidal methods, cercarial destruction and repellents. Records of other schistosomes and animal species infected are given. The second part of the paper is mainly concerned with human clinical manifestations and treatment. Diagnostic methods, acute and chronic signs and symptoms, the use of antimonial preparations in treatment together with unfavourable side effects, the use and recipes of various traditional concoctions, and dwarfism caused by heavy infections of schistosomiasis contracted in early childhood are described and discussed. An account of experimental therapeutics—prophylactic studies—together with tables of tested drugs and their effects is given. N. A. Hancock
- 993—BARUFFA, G. & MAFFI, M., 1958. “Considerazioni sull’impiego di un derivato del tioxantone (Nilodin) nella cura ambulatoria di massa della bilharziosi (schistosomiasi) vescicale nella popolazione rurale in Somalia.” **Archivio Italiano di Scienze Mediche Tropicale e di Parassitologia**, 39 (11), 661–676. [English, French & German summaries pp. 673–674.]  
Baruffa & Maffi treated with nilodin two groups of ambulant patients suffering from schistosomiasis haematobia and free from renal and hepatic disease. The first group, treated during a period of intense agricultural activity, consisted of 23 males, 5 to 15 years old, who received a total of 60 mg. per kg. body-weight of the drug given in two daily doses, one before and one after work, for three days. Pronounced toxic side effects occurred in 12 individuals and none of the group was cured. The second group, treated when agricultural activity was slight, consisted of 84 individuals (50 adults and 34 children), who received a total of 75 mg. per kg. of the drug, similarly administered. Toxic side effects occurred in 39 adults and 16 children; and six weeks later radical cure was observed to have occurred in only eight members of the group, six of whom were adults. The authors emphasize the low rate of cure in children and conclude that, having regard to the frequency and severity of symptoms of intolerance even with such relatively low dose rates, ambulatory treatment of vesical schistosomiasis with nilodin is impractical. J. M. Watson
- 994—BEUKERING, J. A. VAN, 1957. [Medical Officer, Holland Syndicate, Kade (Gold Coast).] “Treatment of schistosomiasis caused by *S. haematobium*.” **Documenta de Medicina Geographica et Tropica**, 9 (3), 259–260.  
Beukering treated 10 patients suffering from *Schistosoma haematobium* infection with a daily intravenous injection of 225 mg. of sodium antimony gluconate (Triostam) for from 5 to 18 days. Following treatment the urine of nine of the patients was free from ova. In the tenth patient treatment was discontinued on account of drug dermatitis. J. M. Watson
- 995—BRESLAW, L., 1958. [Department of Medicine, U.S. Public Health Service, U.S. Penitentiary, Lewisburg, Pennsylvania, U.S.A.] “*Schistosoma mansoni* infection in two Puerto Rican prisoners.” **Annals of Internal Medicine**, 49 (6), 1427–1445.  
Breslaw gives a detailed report of two cases of *Schistosoma mansoni* infection from two Puerto Ricans in Lewisburg prison. Clinical symptoms were practically absent except for malnutrition and generalized epigastric pain with mild distention after meals. The most effective method of diagnosis was that of aspirating mucus from proctoscopic material. The treatment

consisted of a complete course (90 c.c.) of fuadin for the first patient, which resulted in negative stool and proctoscopic examinations after two months. After that the patient was treated with antimony potassium tartrate; an 0.5% solution was slowly injected intravenously, with a total dose of 440 c.c. The second patient, who was also treated with tartar emetic, showed marked toxic side effects, bromsulphalein retention reaching 30% and eosinophilia 76%; but stool and proctoscopic examinations were negative after the therapy. Distribution of schistosomiasis in Puerto Rico is also discussed.

N. Jones

\*996—CHANG, C. M., 1959. [Acupuncture in prevention of toxic reactions to antimony preparations: observations on effect of 263 needlings.] *Chinese Journal of Internal Medicine*, 7 (5), 472. [In Chinese.]

Chang found that acupuncture, applied to schistosomiasis patients half-an-hour before treatment with antimony preparations and continued until half-an-hour after treatment, reduced toxic reactions compared with those shown by patients not given acupuncture. However, he states that in 26 cases various types of reaction did in fact occur. [Taken from an abstract in *Chin. med. J. Peking*, 78, 585.]

N. A. Hancock

\*997—CHANG, M. ET AL., 1959. [A clinical study of intestinal obstruction caused by *Schistosoma japonicum*.] *Chinese Journal of Surgery*, 7 (1), 53–55. [In Chinese.]

32 cases of acute schistosomiasis japonica were treated and classified into three groups: (i) tumour of the colon; (ii) abdominal mass; (iii) peritoneal adhesions. 16 cases of group (i) were operated upon and 14 were found to have carcinoma. In eight cases of group (ii), five developed obstruction during antimony treatment, two of which had to undergo operation. These latter showed that the mass was formed by the binding together of the greater omentum and the colon and its mesentery. X-ray with barium enema of seven further such cases showed no narrowing or filling of the colon and the authors conclude that the mass was extracolonic. Eight cases of group (iii) were operated upon and showed diffuse adhesions or fibrotic bands in the distal ileum region. [Taken from an abstract in *Chin. med. J. Peking*, 78 (3), 289.]

N. A. Hancock

998—CHANG, Y. C., CHU, C. C. & FAN, W. K., 1957. [Departments of Neurology, Surgery and Pathology, Shanghai First Medical College, Shanghai.] "Cerebral schistosomiasis. An observation of forty-five cases." *Chinese Medical Journal. Peking*, 75 (11), 892–907.

4.3% out of 1,049 cases of schistosomiasis showed cerebral involvement, pathological changes being due to the presence of eggs in the brain tissues. Acute and chronic symptoms were observed, often resembling those of cerebral tumour, and including epileptiform attacks. In cases where granulomata had formed around the ova there was an increase of protein in the cerebrospinal fluid. The condition of all patients with epileptiform attacks improved with antimony treatment. This treatment saved surgical intervention in two cases. There was only one fatal case.

N. Jones

\*999—CHAO, Y. S. & LÜ, S. S., 1959. [An ascaris in the middle ear: a case report.] *Chinese Journal of Otorhinolaryngology*, 7 (2), 152. [In Chinese.]

\*1000—CH'EN, C. ET AL., 1957. [Electrocardiographic manifestations during treatment of paragonimiasis.] *Chinese Journal of Internal Medicine*, 5 (10), 823–826. [In Chinese.]

\*1001—CH'EN, C. H. & YUAN, C. W., 1959. [Progress in investigations on the prevention and treatment of paragonimiasis in New China.] *Chinese Journal of Pediatrics*, 10 (6), 474–475. [In Chinese.]

Ch'en & Yuan, reviewing investigations on paragonimiasis, with an emphasis on this infection in children, classify it according to the clinical symptoms and severity. 98% of proved positive cases were revealed by the complement fixation test and 98.6% by intradermal tests. Combination of tartar emetic and chloroquine treatments had 81.1% efficacy. However, the incidence of side effects increased. [Based on an abstract in *Chin. med. J. Peking*, 79, 557.]

N. Jones



**1002**—CHENG, C. L., ET AL., 1959. [Departments of Medicine, Roentgenology & Biochemistry, Kiangsi Medical College, Kiangsi Schistosomiasis Prevention and Treatment Institute and Communicable Diseases Institute, Chinese Academy of Medical Sciences, Nanch'ang.] "Schistosomal hypophyseal dwarfism. Study of 72 cases." **Chinese Medical Journal. Peking**, **79** (1), 26-31.

Cheng *et al.* report on 72 cases of hypophyseal dwarfism due to schistosomiasis. The patients were 10 to 28 years old; five were females and 67 males. It is presumed that the infection had been acquired at the age of 2-13 years. The most frequent clinical symptoms were hepatomegaly, splenomegaly, diarrhoea, weakness, emaciation and ascites. Laboratory, endocrinological and radiological studies are also described in detail. Some features of these were anaemia in 43.1%, average actual height 26 cm. below the mean height for the average actual age and subcalcification of bones. *Schistosoma japonicum* eggs were found in the faeces of 86.1% of the total number of patients. The authors describe this phenomenon as selective hypopituitarism. N. Jones

**\*1003**—CHOU, H. C. & HUANG, F. M., 1959. [Therapeutic effect of pumpkin seed in treatment of acute schistosomiasis.] **Chinese Journal of Internal Medicine**, **7** (8), 764-767. [In Chinese.] 80 gm. of pumpkin seed powder, given three times daily for one month, in 89 cases of acute schistosomiasis resulted in improvement of the general condition and elimination of fever during treatment. At the end of treatment the volume of the liver diminished and the organ became less sensitive. The only side effects were some indigestion or diarrhoea. The incidence of cure was 22.6%, as indicated by faecal hatching tests. [Based on an abstract in **Chin. med. J. Peking**, **79**, 459.] N. Jones

**\*1004**—CHOU, H. C., HSIN, T. Y., CHANG, C. S. & CHU, P. H., 1959. [*Lobelia radicans* compound in treatment of ascites in late stage schistosomiasis: clinical analysis of 120 cases.] **Chinese Journal of Internal Medicine**, **7** (5), 406-408. [In Chinese.]

**1005**—CHU, S. H. ET AL., 1959. [Chung Shan Medical College.] "Mass treatment of *Fasciolopsis buski* infestation among school children in Canton." [Abstract.] **Chinese Medical Journal. Peking**, **78** (3), 273.

31.1% of 1,476 children were positive for *Fasciolopsis buski* infection, with an average of 3,000 ova per gm. of faeces. 346 cases were treated with tetrachlorethylene, and 218 of these on follow-up examination showed a cure rate of 74.8%. 94 cases were given hexylresorcinol; 45 of these on follow-up examination showed a cure rate of 76.3%. The first drug is recommended for mass treatment. N. A. Hancock

**\*1006**—CHU, C. M., CH'EN, S. H. & LIU, H. S., 1959. [Schistosomiasis dwarfism treated by tartar emetic.] **Chinese Journal of Internal Medicine**, **7** (2), 158-163. [In Chinese: English summary pp. 14-15.]

Five patients who had been heavily infected with *Schistosoma japonicum* during or before maturation showed delayed growth in various manifestations. After treatment with tartar emetic varying degrees of clinical improvement were noted. The authors believe that infection with *Schistosoma* caused hypofunction of the pituitary gland resulting in delayed maturation and underdevelopment. [Taken from an abstract in **Chin. med. J. Peking**, **78**, 382.]

N. A. Hancock

**1007**—CHU, S. S., WU, Y. H. & CHOU, C. C., 1959. [Chung Shan Medical College.] "Further observations on the effect of treatment of clonorchiasis with chloroquine." [Abstract.] **Chinese Medical Journal. Peking**, **78** (3), 274.

Six cases were treated with chloroquine after cholecystectomy while the T-tube was in position for biliary drainage. A range of dosage from 20.8 to 54.6 gm. was applied for from 28 to 74 days. Varying numbers of dead worms were collected from the T-tubes and stool examinations up to 15 months later gave negative results. A further case was given no chloroquine; no worms were collected from the T-tube and later oral administration of chloroquine resulted in a cure. N. A. Hancock

**\*1008**—CHUANG, C. K., 1957. [Relationship between schistosomiasis japonica and carcinoma of the colon.] **Chinese Journal of Surgery**, **5** (10), 832-834. [In Chinese.]

**1009**—DESCHIENS, R. & LAMY, L., 1957. [Institut Pasteur, Service de Parasitologie.] "Les aspects épidémiologiques et prophylactiques de la distomatose hépatique en France." **Bulletin de l'Académie Vétérinaire de France**, **30** (10), 507-514. [Discussion pp. 515-516.]  
Deschiens & Lamy discuss epidemiological and prophylactic aspects of hepatic distomiasis, especially in man, in France. N. Jones

**1010**—DÍAZ MUÑOZ, A. & BRISEÑO, C., 1957. [Instituto de Salubridad y Enfermedades Tropicales, Mexico, D.F.] "Un caso humano de fasciolosis hepática." **Revista del Instituto de Salubridad y Enfermedades Tropicales, Mexico**, **17** (2), 89-91. [English summary p. 91.]

**1011**—EGIDIO, M. DI, 1958. [Clinica delle Malattie Tropicali e Subtropicali dell'Università di Roma, Italy.] "Nozioni sulla distribuzione geografica e sull'epidemiologia della bilharziosi intestinale ed urinaria nello Yemen." **Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia**, **39** (11), 685-708. [English & French summaries pp. 706-707.]

After reviewing the topographical and climatic features of the Yemen and the distribution of the population therein, Egidio presents a collection of data concerning the incidence of schistosomiasis, obtained from the records of urine and faecal examinations in the Ahmed I Royal Hospital in Ta'iz, to which patients come from all parts of the kingdom. In 1955, 482 out of 1,952 stool specimens (24.6%) were positive for eggs of *Schistosoma mansoni* and 47 out of 1,484 urines (3.1%) contained eggs of *S. haematobium*. In 1957 the corresponding figures were 352 out of 4,148 (8.4%) and 41 out of 2,795 (1.4%). *S. mansoni* patients came from a wider range of territory than *S. haematobium* patients, who were mainly concentrated around the city of Haggia on the northern mountain plateau. Notable foci of *S. mansoni* infection were the cities of Ta'iz, 'Ibb and Gibla in the south midlands and highlands, while secondary centres of *S. haematobium* infection, such as Caucaban and Suda were all in the northern highlands. Incidence was highest in those between the ages of 20 and 30. Males were more frequently infected than females, possibly as a result of ritual ablution in the snail-infested basins of mosques. Egidio quotes Kuntz (1952) in support of the belief that *Biomphalaria botssyi arabica* is the vector of *S. mansoni* and *Bulinus truncatus* of *S. haematobium*. He concludes that the Yemen is an important area of endemic schistosomiasis particularly characterized by scattered foci of high intensity. The paper is illustrated by a map, six graphs, seven tables and two photographs. J. M. Watson

**1012**—HALAWANI, A. & BADRAN, A., 1958. [Institute of Research for Tropical Medicine, Cairo.] "The value of rectal biopsy in the diagnosis of urinary schistosomiasis." **Journal of the Egyptian Medical Association**, **41** (9/10), 439-446.

Halawani & Badran examined in Cairo by rectal biopsy 106 patients of whom 42 showed *Schistosoma haematobium* ova in the urine. 20 showed *S. mansoni* and 10 *S. haematobium* ova in the faeces, 18 showed ova of both species in the stools, and two showed ova of both species in the urine; 14 with urinary complaints showed no schistosome ova in either stools or urine. They concluded that rectal biopsy is valuable in the detection of either infection provided that it is based upon the recovery of viable eggs of either species. This indicates an active intestinal infection necessitating specific treatment; whereas the recovery of dead ova, especially in the case of *S. haematobium*, does not denote an active infection but merely indicates that the patient has been infected with schistosomiasis at some time or other. J. M. Watson

\***1013**—HSÜ, L. Y., 1959. [Sudden death following Jacksonian epilepsy due to cerebral schistosomiasis japonica.] **Chinese Journal of Neurology and Psychiatry**, **5** (2), 121-123. [In Chinese.]

\***1014**—HSÜ, T. C. & CHUO, C. H., 1959. [The effect of glucose on electrocardiographic change following tartar emetic treatment of schistosomiasis japonica.] **Chinese Journal of Internal Medicine**, **7** (1), 68-71. [In Chinese.]

In 20 and 19 cases respectively, 50% glucose and normal saline solutions were used as solvents for the tartar emetic in a 20-day treatment course. Changes of T-wave were dominant and were more marked as the drug increased. One week later, 35.3% of each group showed improvement of the T-wave, and a month later 10 of the glucose group examined showed no change of the T-wave. Only one of seven saline cases followed up showed any change. In both groups the Q-T interval was prolonged. [Taken from an abstract in **Chin. med. J. Peking**, **78**, 287.] N. A. Hancock



**1015**—KISSEL, P., DEBRY, G., BOULANGÉ, M. & JÉROME, M., 1958. "Distomatose à *Dicrocoelium lanceolatum*." **Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris, 4e Série, 74** (30/31), 765-768.

Kissel *et al.* report on a case of human infection with *Dicrocoelium dendriticum*. Only digestive symptoms, such as anorexia and abdominal pains were observed. The eosinophil count reached 26%. The intradermal test was positive. Numerous eggs of the parasite were found in the faeces. Treatment with emetine improved the general condition of the patient, but eosinophilia persisted.  
N. Jones

**1016**—KOONAVISAN, L., CHAIPORN, V. & DHARAMATAT, A., 1960. [Siraraj Hospital, Bangkok, Thailand.] "Schistosomiasis in Thailand." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene, 54** (1), 5.

A tumour mass from a patient operated upon for adenocarcinoma of the colon was examined and numerous ova of *Schistosoma japonicum* were found. Two weeks later, similar eggs were found in a section taken at sigmoidoscopy. This is the first report of schistosomiasis in Thailand.  
N. A. Hancock

**1017**—KROTKIEWSKI, A., PIOTROWSKI, Z. & SICIŃSKI, A., 1957. [I Klinika Chorób Wewnętrznych, Warszawa, ul. Nowogrodzka 59, Poland.] "Motylia chińska—*Clonorchis sinensis*." **Polski Tygodnik Lekarski, 12** (48), 1866-1869. [English & Russian summaries p. 1869.]

Krotkiewski *et al.* briefly consider the diagnosis, clinical picture, pathology and treatment of *Clonorchis sinensis* in man and describe two case histories of this infection from a Korean hospital. Both men had resided a few years previously in China.  
G. I. Pozniak

**1018**—LANOIX, J. N., 1959. [División de Saneamiento del Medio, Organización Mundial de la Salud, Ginebra, Suiza.] "Las relaciones entre la ingeniería hidráulica y la bilharziasis." **Boletín de la Oficina Sanitaria Panamericana, 46** (4), 329-346.

[This is a translation of the paper published in 1958 in **Bull. World Hlth Org.**, 18, 1011-1035. For abstract see **Helm. Abs.**, 27, No. 1030.]

**1019**—LEITE, G., 1957. "Critério de cura parasitológica e imunidade racial na esquistossomose mansoni." **Revista Brasileira de Medicina, 14** (12), 867-869.

Leite discusses the relative merits of various criteria of cure in cases of *Schistosoma mansoni* infection and concludes that the absence of viable eggs in rectal biopsies, taken four months after treatment, is perhaps the most reliable although this does not indicate the possible presence of an all-male residual infection. The author also considers the problem of racial immunity to schistosomiasis and concludes that for possibly undetermined reasons the negroes in South America show fewer clinical symptoms of the disease but that all races are equally susceptible to infection.  
C. A. Wright

**1020**—LI, T. Y., LI, P. C. & WANG, T. H., 1959. [Shenyang Medical College.] "Epidemiologic study of paragonimiasis in the districts of Fengch'eng, K'uantian and Huanjen, Liaoning Province." [Abstract.] **Chinese Medical Journal, Peking, 78** (3), 272.

A total of 1,058 persons from four villages were examined for the presence of *Paragonimus* ova in the sputum. Varying rates of infection from 37.54% to 0.63% were found. Males were more frequently infected than females, and young people more than old. The first intermediate host was *Semisulcospira peregrinonum* Heude, a new record as such in China, and the second intermediate host was *Astacus (Cambaroides) dauricus*. The incidence rate among crayfish varied from 93.6% to 44.0%, and the burden of metacercariae varied from 1 to 352 with an average of 27.88. Of 714 villagers, 242 admitted eating raw crayfish.  
N. A. Hancock

**1021**—MANSON-BAHR, P. E. C. & LINSELL, C. A., 1960. "Does schistosomiasis matter?" [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene, 54** (1), 11.

A patient in Mombasa, who had suffered from recurrent jaundice and fever for the previous 10 years, showed large numbers of *Schistosoma mansoni* ova on rectal biopsy. Laparotomy showed no obstruction of the bile-ducts, but liver biopsy showed tubercles on the surface and internally, caused by degeneration and fibrosis around ova. Curing of the schistosomiasis by organic antimonials improved the condition and eradicated jaundice, some fever remaining.  
N. A. Hancock

- 1022—MAO, Y. C. ET AL., 1959. [Department of Medicine, Chinhua First Hospital, Chinhua.] "Oral tartar emetic treatment of schistosomiasis japonica." **Chinese Medical Journal. Peking**, 78 (6), 532-541.
- 556 chronic cases of schistosomiasis japonica at various stages were given compound tartar emetic composed of tartar emetic and sodium bitartrate, presented as enteric-coated capsules or tablets. The dosage was increased during treatment from 30 mg. per day to 300-450 mg. per day until a total dosage of 100-120 mg. per kg. body-weight had been received. Although the immediate therapeutic effect was 90% in some cases, the average remote effect was about 66% and in some cases much lower values were reported. Clinical condition was generally improved and reactions were mainly limited to gastro-intestinal symptoms. The use of tartar emetic by previous workers and the best methods of presentation are reviewed and discussed. N. A. Hancock
- 1023—MORETTI, G., 1959. "La distomatose hépatique." **Maroc Médical**, 38 (404), 218-222. Moretti discusses *Fasciola hepatica* infection in man and outlines its epidemiology, aetiology, therapy and prophylaxis. N. Jones
- 1024—NELSON, G. S., 1959. [Division of Insect Borne Diseases, Medical Research Laboratory, Nairobi, Kenya.] "*Schistosoma mansoni* infection in the West Nile district of Uganda. V. Host-parasite relationships." **East African Medical Journal**, 36 (1), 29-35.
- Nelson, after referring to some of his previous work on schistosomiasis in the West Nile [for abstracts see Helm. Abs., 27, Nos. 230a & 230b], discusses acquired immunity to schistosomiasis. Having quoted a number of works on this subject, he concludes that acquired immunity would not be enough to account for the relative mildness of *Schistosoma mansoni* infection in the West Nile adults, but that racial tolerance and low pathogenicity of the local strain of *S. mansoni*, provide a more satisfactory explanation of the fact that Africans are less affected by schistosomiasis in the West Nile and East African regions than elsewhere. N. Jones
- 1025—NÉTIK, J. & LETAC, R., 1957. "Mort simultanée de deux jeunes bilharziens par urémie aigue. Présence d'oeufs de schistosomes dans le parenchyme rénal." **Bulletins et Mémoires de l'Ecole Nationale de Médecine et de Pharmacie de Dakar**, 5, 223-228. [English, Spanish & Portuguese summaries pp. 227-228.]
- Nétik & Letac describe two fatal cases of acute uraemia. At autopsy *Schistosoma* eggs were found not only in the bladder but also in the kidneys. It is concluded that the presence of eggs in the renal cortex implies that nephritis was due to schistosomiasis. The authors go on to discuss the problems of identification of *S. mansoni* and *S. haematobium* from histo-pathological sections. They also discuss some other cases of schistosomiasis. The paper is illustrated with photomicrographs. N. Jones
- 1026—RIBEIRO, H. DE P., 1957. "A esquistossomose em Jaboticatubas." **Revista Brasileira de Medicina**, 14 (9), 653-655.
- Ribeiro describes the finding of an exceptionally heavy infection rate (said to be about 100%) with *Schistosoma mansoni* in the town of Jaboticatubas near Belo Horizonte, Minas Gerais, Brazil. An infection rate of 80% in snails from the streams in the town is also recorded. A programme of sanitary education has been instituted and artesian wells provided so that a source of uncontaminated water is available to the population of the town. C. A. Wright
- 1027—RICHERT, J. H. & KRAKAUR, R. B., 1959. [Fitzsimons Army Hospital, Denver, Colorado, U.S.A.] "Diffuse pulmonary schistosomiasis. Report of two cases proved by lung biopsy." **Journal of the American Medical Association**, 169 (12), 1302-1306.
- 1028—SHEN, Y. P., 1959. [Nanking Medical College.] "Human infection of *Echinostoma revolutum* in Tali, Yunnan." [Abstract.] **Chinese Medical Journal. Peking**, 78 (3), 278.
- Four cases, with a rate of infection of 0.38%, were successfully treated with 2 to 3.5 ml. tetrachlorethylene followed by a saline purgative. *Viviparus viviparus* has been shown to be the second intermediate host by feeding encysted cercariae from the snails to mice from which adult *Echinostoma revolutum* were subsequently recovered. N. A. Hancock



- \*1029—SSUT'U, H. M., 1959. [Clonorchiasis with pulmonary infiltration and eosinophilia: a case report.] **Chinese Journal of Internal Medicine**, 7 (2), 168–170. [In Chinese: English summary pp. 15–16.]

A patient with marked leucocytosis and eosinophilia, pulmonary infiltration showing on X-ray and ova of *Clonorchis sinensis* in the faeces, was treated with 14 gm. of chloroquine over 22 days. The ova disappeared from the faeces, eosinophilia and leucocytosis were reduced considerably and infiltration of the lung cleared up. [Taken from an abstract in **Chin. med. J. Peking**, 78, 382.]  
N. A. Hancock

- \*1030—SU, T. F., 1959. [Prevention and treatment of childhood schistosomiasis in New China.] **Chinese Journal of Pediatrics**, 10 (5), 422–423. [In Chinese.]

- 1031—SUWANIK, R. & HARINSUTA, C., 1959. [Department of Radiology, Siriraj Hospital and Medical School, Dhonburi, Thailand.] “Pulmonary paragonimiasis. An evaluation of roentgen findings in 38 positive sputum patients in an endemic area in Thailand.” **American Journal of Roentgenology, Radium Therapy and Nuclear Medicine**, 81 (2), 236–244.

The abnormal roentgen findings in the chest of 36 of 38 patients with sputa positive for *Paragonimus westermani* were classified as follows: (i) characteristic ring shadows, (ii) opacities with poorly defined borders, (iii) linear infiltration and (iv) pleural thickening. Contrary to the findings of Yang *et al.* in 1955 (published in **Diseases of the Chest**, Chicago, 27, 88–95) the ring shadows were the most prominent feature, being present in 31 of the cases. The observations are discussed and illustrated.  
S. Willmott

- 1032—T'ANG, S. T. & CH'EN, J. H., 1959. [Szechuan Medical College, Chengtu.] “3-day tartar emetic treatment of schistosomiasis japonica in children.” **Chinese Medical Journal. Peking**, 79 (2), 124–129.

T'ang & Ch'en treated *Schistosoma japonicum* infection in 388 children 2 to 12 years old, with intravenous tartar emetic (1% solution) at a total dose of 13 to 14 mg. per kg. body-weight, giving two injections a day for three successive days. The side effects, as compared with those of a previous treatment of adults with 12 mg. per kg. were less severe. Abdominal pains, however, were twice as frequent as in adults. 44.4% of those children who received 13 mg. per kg. and 37.6% of the 14 mg. per kg. group still showed eggs in the faeces after treatment. The authors conclude that in cases of chronic schistosomiasis in children the minimum dose of tartar emetic should be 14 mg. per kg. body-weight.  
N. Jones

- 1033—TREDRE, R. F., 1957. [Ross Institute, London School of Hygiene and Tropical Medicine.] “Schistosomiasis or bilharziasis.” **Chemistry & Industry. London**, Year 1957, No. 34, pp. 1138–1143.

Tredre gives a clear account of schistosomiasis, illustrated by sketch maps and diagrams. After a brief introduction, he deals with the disease under the following heads: Distribution in Africa; objectives; paths to eradication; effect on the individual; snails; molluscicides; and the irrigation problem. After comparing research in the two diseases he concludes that progress in schistosomiasis lags 20 to 25 years behind that in malaria. By the use of available drugs and known hygienic measures heavy infections and repeated reinfections could be obviated and individual worm loads reduced to a low level, if not eliminated.  
J. M. Watson

- 1034—WANG, S. H. & LIU, K. N., 1959. [Department of Radiology, Peking People's Hospital, Peking Medical College, Peking, China.] “Present status of roentgenology in the diagnosis of paragonimiasis.” **Chinese Medical Journal. Peking**, 79 (5), 446–455.

The authors describe and classify the anatomo-pathological changes in different organs caused by paragonimiasis and discuss their radiological appearances. They conclude that paragonimiasis of the lungs, abdomen and central nervous system can be reliably diagnosed by X-ray examination.  
N. Jones

- \*1035—WU, Y. S. ET AL., 1959. [Treatment of acute schistosomiasis: an analysis of 545 cases.] **Chinese Journal of Internal Medicine**, 7 (8), 760–763. [In Chinese.]

545 cases of acute schistosomiasis received a prolonged treatment (up to 47 days) with potassium antimony tartrate, the dosage varying according to the patients' condition. In some cases the

patients received a preliminary hormonal treatment and blood transfusions. Three deaths occurred during the treatment. As a result of the treatment symptoms disappeared totally or partially in 97·6% and faeces became negative in 89·3% of the cases. Cortisone and prednisone had a better effect in lowering fever and reducing allergic and toxæmic symptoms than did ACTH. [Based on an abstract in **Chin. med. J. Peking**, 79, 458.] N. Jones

### Cestoda

See also Nos.: 1247, 1432, 1500, 1519, 1520, 1532, 1537, 1544, 1576.

**1036**—BACA PUERTA, A., 1959. [Instituto "López-Neyra" de Parasitología, Universidad de Granada, Spain.] "Un caso de quiste hidatídico abdominal y aportación bibliográfica sobre la hidatidosis en la Península Ibérica." **Revista Ibérica de Parasitología**, 19 (4), 391–410. [English summary p. 410.]

A boy was admitted to hospital in Granada in Spain with an acute abdominal syndrome which was traced to hydatid of the liver. The cyst was drained over a period of about a month, leaving a fistula which closed on the 45th day. Baca Puerta concludes this case report with 16 pages of references to Spanish works on hydatidosis in the Iberian Peninsula which were not included in the extensive bibliography published in the work "Hydatidosis in Spain" by López-Neyra & Soler Planas in 1944. M. McKenzie

**1037**—CANABAL, E. J. ET AL., 1957. [Centro de Estudios Superiores de Medicina Interna, Departamento di Cardiología, Facultad de Medicina, Montevideo, Uruguay.] "Nuestra experiencia en el tema de la equinococosis cardíaca." **Anales de la Facultad de Medicina de Montevideo**, 42 (1/2), 33–39. [English summary p. 38.]

Canabal *et al.* reiterate their experience in cardiac hydatid from 1933 to 1954 inclusive, comprising 16 cases. N. Jones

**1038**—CAPONE BRAGA, P., 1957. [Roma, Istituto Superiore di Sanità, Laboratorio di Microbiologia.] "Considerazioni sulla diffusione dell'echinococcosi in Italia." **Rendiconti Istituto Superiore di Sanità**, 20 (11), 1050–1068. [English, French & German summaries pp. 1050–1051.]

Capone Braga discusses the incidence of human hydatid in Italy. After quoting extensive statistical data, the author rejects the view that the incidence has increased appreciably during recent years, as certain authors claim. N. Jones

**1039**—CHIN, T. H., 1959. [Kweiyang Medical College.] "Epidemiology of taeniasis in southwestern China with a discussion on its control measures." [Abstract.] **Chinese Medical Journal, Peking**, 78 (3), 275.

Chin concludes from observations and literature that endemic foci of taeniasis exist in southwest China. 26·51% of 611 persons at one village were infected with *Taenia saginata*, 19 cases were successfully treated with pumpkin seeds and areca nuts. Personal hygiene, feeding of live-stock and method of cooking are considered to require improvement. N. A. Hancock

**1040**—CONROY, D. A., 1959. [Department of Microbiology, Messrs. Crosse & Blackwell Ltd., Crimscott Street, London, S.E.1.] "The relationship between eosinophilia and anaemia in a case of infection with *Taenia saginata*." **Revista Ibérica de Parasitología**, 19 (4), 411–415.

Conroy illustrates, by two graphs, the correlation he observed between a reduction in eosinophil count and an increase in haemoglobin level in the blood of a woman infected with *Taenia saginata*, when he examined her blood over a period of eleven days starting three days before she was treated with male fern extract. M. McKenzie

**1041**—DVALI, L. G., 1958. [Khirurgicheskaya Kafedra, Tbilisski Gosudarstvenni Institut usovershenstvovaniya vrachei.] "Phlegmonous cholecystitis on the background of obturation of the common bile duct by an echinococcal cyst." **Khirurgiya. Moscow**, 34 (11), 117–118. [In Russian.]

Dvali reports on a case of phlegmonous cholecystitis associated with obstruction of the common bile-duct by a hydatid cyst. The patient had complained of pains in the right hypochondrium, nausea, vomiting and fever. At operation, daughter cysts and hydatid fluid were recovered from the common bile-duct. N. Jones



- 1042**—GOINARD, P. & PEGULLO, J., 1957. "Kyste hydatique sous-péritonéal à développement clinique explosif à la suite d'une intervention pour kyste hydatique du foie." *Afrique Française Chirurgicale*, **15** (2), 157-158.
- 1043**—LAGROT, F. & CORIAT, P., 1957. "Volumineux kyste hydatique suppuré du foie fistulisé dans une trompe. Traitement par résection de l'adventice extrahépatique. Mise à plat et fermeture pariétale primitive." *Afrique Française Chirurgicale*, **15** (2), 161-165.
- 1044**—LAHBABI, H., 1959. "La maladie hydatique au Maroc." *Maroc Médical*, **38** (404), 126-129. [English summary p. 129.]  
Lahbabi reports that 1.6% of 10,000 operations carried out at the Maurice-Gaud Hospital in Casablanca in 1956-57, were on cases of hydatid disease. In 37.5% of the operated cases, hydatid cysts were localized in the liver. Partial cystectomy, i.e. removal of the extra-hepatic part of the cyst, was preferred to total cystectomy or marsupialization. In 31.25% of the cases, mainly males and young people, the cysts were localized in the lungs and in these cases Ugon's method was preferred. Cysts also occurred in the spleen, kidney, peritoneum, mesentery, genitalia, muscular masses and nervous system. N. Jones
- 1045**—LILLO, F. DE, 1958. [Istituto di Clinica Chirurgica dell'Università di Roma.] "Considerazioni sul trattamento delle cisti da echinococco polmonari nella prima e seconda infanzia." *Annali di Medicina Navale e Tropicale*, **63** (5), 587-597. [English summary p. 597.]  
Lillo reports on 43 successful operations for pulmonary hydatid cysts in children 3 to 12 years old. [The English summary gives the age range as 3-5 years.] It is stressed that even at a very young age, surgical intervention, using the free pleura method, is well tolerated. N. Jones
- \*1046**—LIU, W. M., 1959. [Hydatid cysts.] *Chinese Journal of Surgery*, **7** (11), 1099-1100. [In Chinese.]
- 1047**—MICHON, P. ET AL., 1958. "L'échinococcose alvéolaire du foie. Données cliniques et anatomo-pathologiques." *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, **4e Série 174** (15/16), 349-360.  
Michon *et al.* report on three cases of alveolar hydatid of the liver. One of the three patients, who had been ill for five years and had been operated on previously for gallstones, died two days after surgical intervention, during which numerous scoleces were found in the right lobe of the liver and common bile-duct. The latter was completely blocked. Clinical, anatomical, therapeutical and parasitological aspects of the disease are discussed. N. Jones
- 1048**—NOTE, D. & PANTIN, J. P., 1957. "Kyste hydatique du tibia. Eléments diagnostiques et perspectives thérapeutiques." *Afrique Française Chirurgicale*, **15** (2), 189-194.  
Note & Pantin report on a case of hydatid in the tibia and discuss its diagnosis, operative technique and therapeutic aspects. The paper is illustrated with diagrams. N. Jones
- 1049**—OSIMANI, J. J., 1958. [Instituto de Higiene de la Facultad de Medicina, Cátedra y Departamento de Parasitología, Policlínica de Enfermedades Parasitarias, Uruguay.] "Infecciones múltiples por las tenias llamada 'solitarias'. A proposito de un caso con 9 ejemplares de *Taenia solium*." *Anales de la Facultad de Medicina de Montivideo*, **43** (5/6), 223-228. [English summary p. 228.]  
Osimani describes the asymptomatic case of a patient from Portugal who expelled nine specimens of *Taenia solium*, eight of them simultaneously, following treatment with extract of male fern. Not only is this the first case of multiple parasitism with *Taenia* sp. to be reported from Uruguay, but also there has only been one previous record of an autochthonous case of *T. solium* infection in man. Cysticerciasis cellulosa in pigs in Uruguay is rare. J. M. Watson
- 1050**—PETUKHOV, M. I., 1958. [Kafedra obshchei khirurgii, Kuibyshevski Meditsinski Institut.] [Diagnostic significance of eosinophilia in echinococcosis.] *Sovetskaya Meditsina*, **22** (9), 120-121. [In Russian.]  
Petukhov studied eosinophilia from 260 patients with various localizations and clinical forms of hydatid disease. He found that, taking the normal eosinophil count as 4%, eosinophilia was present in 34.2% of cases; and that higher eosinophil counts were present in cases of multiple hydatid. It is concluded that eosinophilia alone cannot be considered as of diagnostic significance in hydatid disease. N. Jones

**1051**—SIMONETTI, N., 1958. [Istituto d'Igiene dell'Università di Bari, Italy.] "Idatidosi malattia sociale e del lavoro." **Igiene e Sanità Pubblica**, 14 (11/12), 645-651. [English, French & German summaries, p. 645.]

Simonetti reviews some facts and figures in relation to the clinical and epidemiological aspects and incidence of hydatidosis. He urges that this infection should be classed as an occupational disease in order that workers who contract it in the course of their duties may be eligible for compensation. More effective prophylactic and control measures are required.

J. M. Watson

**1052**—SUIC, M., 1957. [Centre pour l'Echinococcose, Institut d'Hygiène, Split, Yugoslavia.] "L'échinococcose en Yougoslavie." **Bulletin of the World Health Organization**, 17 (3), 492-496.

Suic shows graphically that from 1930 to 1955 inclusive the incidence of human hydatid in Yugoslavia has risen. This phenomenon is partly attributed to better detection technique. Maximum incidence is in the 20-30 years age group. No difference was observed between the sexes. In 37% of all cases the lungs are affected. Economic losses due to the infection and its prophylaxis are discussed.

N. Jones

**\*1053**—TUAN, F. L. & CHENG, S. H., 1957. [Multiple cysticerciasis cellulosa: a case report.] **Chinese Journal of Internal Medicine**, 5 (10), 846. [In Chinese.]

**\*1054**—T'UNG, S. F., 1959. [Ocular cysticerciasis.] **Chinese Journal of Ophthalmology**, 9 (7), 429-432. [In Chinese.]

**1055**—VERDIEV, G. Y., 1958. [Khirurgicheskoe otdelenie, Kirovobadskaya obedinnaya bolnitsa imeni N. Narimanova.] [Acute cholecystitis caused by tapeworms.] **Khirurgiya. Moscow**, 34 (11), 106-107. [In Russian.]

Verdiev recovered numerous tapeworm proglottides from the gall-bladder of a 32-year-old woman. The patient had been ill for three years before the operation.

N. Jones

**\*1056**—WEI, J. L., SHEN, H. Y. & CHAO, J. H., 1959. [Pulmonary hydatid cyst.] **Chinese Journal of Radiology**, 7 (1), 10-14. [In Chinese.]

Wei *et al.* report on 20 cases of pulmonary hydatid cyst and detail associated complications, results of rupture, etc. The Casoni test on 17 cases was positive in all and complement fixation testing on 14 gave five positive results. Typical X-ray pictures were rarely seen. [Taken from an abstract in **Chin. med. J. Peking**, 78, 506.]

N. A. Hancock

**1057**—WERNER, A., 1957. [Clinique Beaulieu, Genève, Switzerland.] "A propos du traitement opératoire de la cysticercose de la base du crâne." **Acta Neurochirurgica. Vienna**, 5 (2/5), 121-127. [English, German, Italian and Spanish summaries pp. 126-127.]

Werner describes two cases of *Cysticercus cellulosae* infection at the base of the cranium. The author approves the employment of Rocca's operative technique in such cases.

N. Jones

## Acanthocephala

*No relevant abstracts in this issue*

## Nematoda

See also Nos.: 988, 1208, 1386, 1415, 1417, 1419, 1420, 1425, 1447, 1466, 1468, 1488, 1500, 1502, 1529, 1532, 1540, 1541, 1547, 1558, 1561, 1564, 1569, 1570.

**\*1058**—ANON., 1959. [One-day treatment of Bancroft's filariasis with hetrazan.] **Chinese Journal of Internal Medicine**, 7 (8), 768-770. [In Chinese.]

**\*1059**—ANON., 1959. [The methods of treatment of biliary ascariasis with emphasis upon the result of acupuncture.] **Chinese Journal of Surgery**, 7 (4), 363-364. [In Chinese.]

Of 81 cases of biliary ascariasis, choledectomy was performed upon 26, 35 were given antispasmodics, analgesics, anthelmintics and antibiotics, and 20 acupuncture. It is claimed



that the last method was most effective in relieving pain. Anthelmintics were given at the same time as acupuncture. [Taken from an abstract in **Chin. med. J. Peking**, 78, 495-496.]  
N. A. Hancock

\*1060—ANON., 1959. [Bean oil in treatment of intestinal obstruction caused by ascarids.] **Chinese Journal of Surgery**, 7 (5), 459-460. [In Chinese.]

\*1061—ANON., 1959. [Traditional and western medicine combined in treatment of biliary ascariasis: report of 44 cases.] **Chinese Journal of Surgery**, 7 (6), 545. [In Chinese.]

\*1062—ANON., 1959. [Traditional drug anthelmintics in treatment of biliary ascariasis: observations on 50 cases.] **Chinese Journal of Surgery**, 7 (6), 546. [In Chinese.]

\*1063—ANON., 1959. [Acupuncture combined with traditional drug *wu mei t'ang* in treatment of biliary ascariasis: report of 48 cases.] **Chinese Journal of Surgery**, 7 (6), 547. [In Chinese.]

\*1064—ANON., 1959. [Acupuncture combined with anthelmintics in treatment of biliary ascariasis: report of 20 cases.] **Chinese Journal of Surgery**, 7 (6), 548. [In Chinese.]

1065—ANON., 1959. [Epidemic Prevention Department, Epidemic Prevention Station, Fukien, China.] "Single dose night treatment of filariasis with hetrazan." **Chinese Medical Journal. Peking**, 78 (3), 226-227.

After experiment with several treatment regimes it was concluded that a single-dose treatment with hetrazan, given at night, was most effective. [Dose level is not stated.] Of 144 cases so treated, 133 became negative for microfilariae. This intensive short-course treatment was then used with success in all endemic areas of malayan filariasis in Fukien Province. The wide use of acupuncture and moxibustion is not possible on account of the scarcity of qualified practitioners.  
J. M. Watson

1066—ANON., 1959. [Antiepidemic and Health Station, Chungking.] "Observations on the therapeutic effect of 1-bromo-2-naphthol in ancylostomiasis." [Abstract.] **Chinese Medical Journal. Peking**, 78 (3), 268.

145 cases of ancylostomiasis treated with five different regimes of 1-bromo-2-naphthol showed a worm clearance rate of 86.9%. A further 138 cases given three successive courses of treatment gave an average cure rate of 22.46%. The group given 6 gm. per day for two days showed the highest rate of cure. No serious side reactions were observed.  
N. A. Hancock

1067—ANON., 1959. [Municipal Antiepidemic Station, Chungking, China.] "Some epidemiologic studies on ancylostomiasis in Chungking." [Abstract.] **Chinese Medical Journal, Peking**, 78 (3), 269.

A survey made in 1956 showed that the period from April to October was the most favourable climatically for the spread of hookworm disease. A more recent study on 29,092 persons showed that 75.1% were infected with an average of 2,888 ova per gm. of faeces in 865 cases. In 27,679 cases, 45.57% had symptoms with no physical signs, 31.37% with no signs or symptoms and 23.07% with both signs and symptoms. Approximately half of the last group had severe signs and symptoms. Latrines and sewage systems showed contamination with ova as did soil from farms.  
N. A. Hancock

1068—AOKI, T., 1959. [Third Department of Internal Medicine, Nagoya University School of Medicine, Nagoya, Japan.] [Clinical observations of Dubini's ancylostomiasis and biological features of mature larvae.] **Journal of the Nagoya Medical Association**, 80 (4), 1062-1080. [In Japanese: English summary p. 1062.]

In most cases Dubini's ancylostomiasis patients showed hypochromic anaemia. Blood sedimentation rate was accelerated with lowering of haemoglobin level. Eosinophilia was generally noted. An occult blood reaction in faeces was positive when there were more than 25 worms, while 21.1% of the cases showed a positive occult blood reaction when there were less than 10 worms. For diagnosis, a culture method of faecal worm eggs was proved to be best. Most of the mature larvae survived for two hours in the gastric and duodenal juice at 37°C. Mature

larvae showed a positive thermotropism but no definite hydrotropism was noted. Positive phototropism was not observed, although at over 31°C. negative phototropism was noted. The larvae could pass through 3% agar. 10% agar prevented their passing and 5% agar showed an intermediate result. It was experimentally proved that house-flies could carry mature hookworm larvae.

Y. Yamao

- 1069—BARABAN, H. & BATKO, B., 1958. [Oddział Wewnętrzny, Szpital Wojskowy, Wrocław, Poland.] "Przelotne nacieki płucne w przebiegu zakażenia węgorkiem jelitowym." *Polski Tygodnik Lekarski*, 13 (41), 1592–1594. [English & Russian summaries p. 1594.]

Baraban & Batko describe two cases of *Strongyloides stercoralis* infection, larvae being found in the bile, duodenal contents and faeces of both patients. In the first case radiological examination revealed transient pulmonary infiltration. Despite heavy infection and a high eosinophil count (21% to 46%) no such infiltration was found in the second case. The first received two treatments, each consisting of 30 mg. of emetine per day during 10 successive days and after six months no more larvae were found in the contents of the duodenum or in the faeces. The second did not tolerate emetine treatment, which was therefore stopped after eight injections. The authors stress the importance of eosinophil counts in the peripheral blood in diagnosing parasitic infections.

N. Jones

- 1070—BASU, P. C., 1957. [Malaria Institute of India, Delhi.] "Filariasis in Assam State." *Indian Journal of Malariology*, 11 (3), 293–308.

3,952 inhabitants of tea plantations and villages in two areas of Assam near the River Brahmaputra were examined for filariasis. Both areas were found to be endemic for *Wuchereria bancrofti* and *W. malayi*, infection being unspecialized for any age-group or sex amongst local people, but the greatest endemicity was observed amongst immigrant labourers. Because of this latter fact, the plantations were found to be foci of infection. Infective larval stages occurred only in *Culex fatigans*, and spraying with BHC appeared to be having little or no effect on the mosquitoes or the larval stages.

N. A. Hancock

- 1071—BAUER, H., BISCHOFF, A., HANSEN, J. & MAGUN, R., 1957. [Neurologische Universitätsklinik Hamburg-Eppendorf.] "*Loa loa* Filariosis mit cerebralen Komplikationen als Berufskrankheit." *Archiv für Gewerbepathologie und Gewerbehygiene*, 15 (5), 429–439.

The case history of a *Loa loa* infection with cerebral disturbances is described from a German ex-sailor. Transient swellings on various parts of the body had occurred one year previously. This *L. loa* infection, with a long clinically latent period, is classed as an occupational disease and, on reference to similar cases in the literature, the cerebral disturbances are explained as a complication of the infection.

G. I. Pozniak

- 1072—BERNI, A. & MASSI, O., 1957. [Comune di Roma, Ufficio d'Igiene e Sanità.] "Un episodio di trichinosi: considerazioni cliniche, epidemiologiche e profilattiche." *Nuovi Annali d'Igiene e Microbiologia*, 8 (5), 471–480. [English summary p. 479.]

Of nine persons who had eaten trichinous meat, seven were taken into hospital while in the other two no clinical symptoms were observed. The course of the disease was benign. The sausage contained about 3.5% of salt and *Trichinella spiralis* were found by artificial digestion. Attempts to infect rats with this meat failed.

N. Jones

- 1073—BORTOLOTTI, G., 1958. [Istituto di Clinica Chirurgica Generale e Terapia Chirurgica dell'Università di Bologna, Italy.] "Occlusione intestinale da ascaridi nell'infanzia." *Annali Italiani di Chirurgia*, 35 (3), 209–220.

Bortolotti describes in detail, with four photographs, two cases of intestinal obstruction due to ascariasis encountered in Bologna, one of which necessitated surgical intervention. He discusses this condition at some length in the light of his own experience and that of others, and emphasizes the difficulty of diagnosis and the necessity of early intervention.

J. M. Watson



**1074**—BRYGOO, E. R., 1957. "La filariose humaine à Madagascar." **Archives de l'Institut Pasteur de Madagascar**, **26**, 23–39.

Brygoo, after giving a brief historical account of human filariasis in Madagascar, reports on a survey of this infection, which was carried out in 1955–57. A total of 18,384 blood samples were examined, covering 60 out of 83 districts of the island. The incidence of filariasis ranged from 0% to 36.64% according to the districts. Microfilariae of *Wuchereria bancrofti* and of *W. bancrofti* var. *vauceli* were found in the blood. The latter type was predominant and in certain cases reached 95% of the total incidence of infection. However, *W. bancrofti* was represented everywhere. *Anopheles funestus*, *A. gambiae* and *Taeniorhynchus uniformis* were found to be the vectors. *Culex fatigans* appeared to play a negligible role. N. Jones

**1075**—BURGOS, E., 1957. [Medico Puericultor del Estado Algeciras, Spain.] "Parasitismo por oxiuros en el lactante." **Acta Pediátrica Espanola**, **15** (172), 287–294. [English summary p. 293.]

Burgos studied the incidence and degree of *Enterobius vermicularis* infection in 140 poor-class children of Algeciras, between the ages of one month and two years. The results are listed according to the sex, age and hygienic conditions. N. Jones

\***1076**—CH'AO, C. F., 1959. [Oxygen therapy in treatment of partial intestinal obstruction due to ascariids.] **Chinese Journal of Surgery**, **7** (6), 603–604. [In Chinese.]

Ch'ao treated acute intestinal obstruction due to impaction of *Ascaris lumbricoides* in 150 children below 14 years of age, with oxygen. Oxygen was administered with an inlaying Levin's tube after fasting and at a total dose of 100 ml. to 150 ml. for each year of age, with two to three minutes' interval after each 200 ml. to 300 ml. In most cases the patients were freed from worms within 48 hours but in rare cases the passing of worms took four days. The cure rate was 98%. [Based on an abstract in **Chin. med. J. Peking**, **79**, 200.] N. Jones

\***1077**—CHANG, M. C. & TENG, C. F., 1959. [Roentgen diagnosis of intestinal ascariasis.] **Chinese Journal of Radiology**, **7** (4), 259–262. [In Chinese.]

25 cases of intestinal ascariasis were diagnosed radiologically. Ascariasis in all the cases was confirmed by anthelmintic treatment. Direct signs of infection are either fine linear shadows of the parasites' intestinal tracts or filling defects among barium-filled intestinal loops. The latter is more frequent. Indirect signs consist of dilatation of the duodenal bulb, duodenal stasis or a pattern of nutrition deficiency in the small intestine. The indirect signs were absent in only two cases and they disappeared after effective treatment. Roentgen examination with g-i series can also determine localization, size and number of worms as well as allowing the study of their evacuation during treatment. *Ascaris* were found stationary in 80% and motile in 16% of the cases. [Based on an abstract in **Chin. med. J. Peking**, **79**, 562.] N. Jones

\***1078**—CH'EN, H. L., 1959. [Haematuria caused by filariasis.] **Chinese Journal of Surgery**, **7** (10), 1019. [In Chinese.]

\***1079**—CH'EN, T. H., 1959. [Local hetrazan-novocaine solution injection into lymph nodes in the treatment of Bancroft's filariasis.] **Chinese Journal of Internal Medicine**, **7** (2), 180. [In Chinese.]

**1080**—CHERRY, J. K., 1959. "Adenolymphocoele and elephantiasis in onchocerciasis." **East African Medical Journal**, **36** (4), 224–230.

Cherry reports on two cases of adenolymphocoele and elephantiasis in males caused by *Onchocerca volvulus* in which infection of the lymph glands had resulted in large pendulant groin swellings. Both cases were treated surgically, one of them receiving diethylcarbamazine and suramin before operation. Histology of the removed swellings is described and discussed. N. A. Hancock

**1081**—CHOU, C. C., WU, C. F. & CHIANG, P. C., 1959. [Municipal Station of Parasitic Diseases, Darien, China.] "Some preliminary observations on the epidemiology of ancylostomiasis in Talien." [Abstract.] **Chinese Medical Journal. Peking**, **78** (3), 269.

Rates of hookworm infection were found to be highest in municipal areas and lowest in urban areas, *Ancylostoma duodenale* and *Necator americanus* being present in the ratio of 2:1. 24.86%

of the cases had no symptoms and female patients showed comparatively severe anaemia. Vegetable farms showed the highest rate of larva infection, and the period from June to September was found to be the best season for transmission. N. A. Hancock

\*1082—CH'Ü, F. Y., 1957. [Survey of microfilarial infections in Hainan Island.] *Acta Microbiologica Sinica*, 5 (3), 239–241. [In Chinese.]

\*1083—CHU, S. H. & CHENG, H. C., 1959. [Early clinical manifestations of ancylostomiasis and the effectiveness of early treatment on the basis of immunodiagnosis.] *Chinese Journal of Internal Medicine*, 7 (8), 731–732. [In Chinese.]

1084—CORITSOGLOU, A. C., 1958. [Case report of strongyloidiasis.] *Acta Microbiologica Hellenica*, 3 (6), 256–260. [In Greek: English summary p. 260.]

Coritsoglou reports a case of strongyloidiasis in a man, and briefly describes the life-history and diagnosis of *Strongyloides stercoralis*. Seven cases in persons who have never been outside Greece have been reported in post-war years. It is suggested that this indicates the presence of endemic foci in Greece which have probably originated from members of the allied and Greek armed forces who spent long periods in areas where the disease is endemic. Coritsoglou suggests that a search should be made for areas in Greece which provide favourable conditions for the nematode, starting in those districts from which cases have already been reported. E. Bennett

1085—CRAIG, G. E., 1959. [Suite 6, 1390 Sherbrooke St. West, Montreal, Quebec.] "Larva migrans in children returning from Florida." *Canadian Medical Association Journal*, 80 (10), 828.

Craig reports three cases of larva migrans in children who, whilst on holiday in Florida, spent long periods on sandy beaches. In the southern U.S.A., this condition is usually attributed to the larvae of *Ancylostoma braziliense*. The causative agent, disorder, and treatment are very briefly discussed. G. A. Webster

\*1086—FAN, P. L., YÜ, T. H. & SU, T. F., 1959. [Prevention and treatment of hookworm, ascariasis and enterobiasis in childhood.] *Chinese Journal of Pediatrics*, 10 (5), 424–428. [In Chinese.]

1087—GORODETSKI, A. S. & KNAFEL, M. E., 1959. [Ukrainski nauchno-issledovatel'ski institut kommunalnoi gigieni.] [Irrigation fields with special reference to sanitary-helminthological aspects.] *Gigiena i Sanitariya. Moscow*, 24 (5), 74–76. [In Russian.]

An examination in 1949–50 of the Kurenevsk fields, which are irrigated directly by town sewage, revealed considerable contamination of the sewage water, the field soil, the root vegetables grown there and of their storage places with *Ascaris* and *Trichuris* eggs. 90% of the farm workers were infected. The effect of sewage purification by sedimentation, as practised in recent years, on these infections is considered. G. I. Pozniak

1088—GÜRALP, N., 1959. "İnsan ve veteriner hekimlerini müstereken ilgilendiren yeni bir paraziter hastalık Weingarten hastalığı veya Frimodt-Möller syndrom'u." *Türk Veteriner Hekimleri Derneği Dergisi*, 29 (148/149), 9–11.

*Toxocara* infection is reported as a new parasitic disease of animals and man in Turkey. In man the larvae have been found in the kidney and brain, where most are destroyed, but more frequently in other tissues. Visceral larva migrans has been seen amongst children under three years old. Inspection and treatment of dogs and cats and the prevention of contact between children and soils contaminated with eggs are the best control measures. T. Öden

\*1089—HSÜ, W. N., 1958. [Filariasis investigation in the suburbs of Nanking.] *Acta Universitatis Nankinensis Scientiarum Naturalium*, No. 2, 101 pp. [In Chinese.]

A filariasis survey, involving 6,736 persons at the Da Ma Dun Co-operative Farm in Kiangning, Kiangsu, showed that the incidence was 7.8% among males and 4% among females. Females had also slightly lower microfilarial counts. These counts were highest in 16-year-olds. The incidence of infection was the same in both sexes after 40 years of age. *Culex pipiens* var. *pallens* is widely distributed in the area and the infection rate with filarial larvae was found to be 18.4%, 12.23% and 8.53% in the three villages of the co-operative farm. [Based on an abstract in *Chin. med. J. Peking*, 79, 97.] N. Jones



**1090**—HU, H. S. & WANG, C. Y., 1959. [Szechuan Medical College.] "Studies on the control of hookworm. IV. The effect of iron on the egg output and on the disease." [Abstract.] **Chinese Medical Journal. Peking**, **78** (3), 270.

Ferrotherapy, i.e. administration of 1.8 gm. ferrous sulphate daily for eight weeks, given to 22 cases of ancylostomiasis, produced a steady decrease in output of hookworm ova. The blood picture was quickly restored to normal, and the dirt-eating habits of 18 patients were almost entirely eradicated.

N. A. Hancock

**1091**—JACOB, G. F., 1957. [Medical Laboratory, Kampala.] "A study of the relationship between sickling and hookworms." **East African Medical Journal**, **34** (11), 597–600.

As a result of examining 339 persons of both sexes and all ages in the village of Senda, near Tororo, Jacob found no diminution in the effects of hookworm infection in those possessed of the sickle-cell trait and no difference in hookworm rates between sicklers and non-sicklers. It is possible that the lowered haemoglobin levels in the non-sicklers would have shown statistical significance had the series been larger, but so small an effect would be of no practical importance, even if its relation to malaria were excluded and to hookworm proved.

J. M. Watson

**1092**—JANSSENS, P. G., 1957. [Prince Leopold Institute of Tropical Medicine, Antwerp, Belgium.] "Acute ancylostomiasis. Report on a case." **Documenta de Medicina Geographica et Tropica**, **9** (1), 9–10.

**1093**—JOPLING, W. H., 1960. [Hospital for Tropical Diseases, London.] "Onchocerciasis presenting without dermatitis." **British Medical Journal**, Year 1960, **1** (5176), 861.

Jopling describes two cases of onchocerciasis contracted in Uganda. *Onchocerca volvulus* was found in skin shavings but neither dermatitis nor pruritus occurred.

W. K. Dunscombe

**\*1094**—KUNG, S. H., 1957. [Preliminary observations on treatment of hookworm with decocta arecae.] **National Medical Journal of China**, **43** (10), 807–808. [In Chinese.]

**1095**—LAFFERRE, M. & BECMEUR, 1959. "L'ancylostomose dans les mines de phosphate marocaines." **Maroc Médical**, **38** (404), 226.

Lafferre & Becmeur briefly discuss ancylostomiasis in workers in the phosphate mines of Morocco. Control measures are outlined.

N. Jones

**\*1096**—LI, L. S. ET AL., 1959. [Studies on the dosage and effect of hetrazan in filariasis.] **Chinese Journal of Internal Medicine**, **7** (1), 60–67. [In Chinese.]

Follow-up examination of 181 cases of bancroftian and malayan filariasis treated with hetrazan and 50 cases of bancroftian filariasis treated with hetrazan and carbarsone showed favourable results from blood smears, although the carbarsone addition did not reinforce the action of hetrazan. Microfilariae in lymphatic channels or hydroceles were not so well eradicated and local injections of hetrazan had no effect. [Taken from an abstract in **Chin. med. J. Peking**, **78**, 286.]

N. A. Hancock

**1097**—LIEN, S. H., 1959. [Department of Radiology, Shantung First Provincial Hospital, Shantung.] "Radiographic diagnosis of biliary ascariasis." **Chinese Medical Journal. Peking**, **78** (6), 545–556.

Lien reports that by introducing dilute barium paste into the duodenum via a drainage tube, it is possible to distinguish by X-ray ascarids either in the intestine or common bile-duct. The essential differentiating points are listed and clinical data and radiographical diagnosis of 41 cases are tabulated. Pushing and compression are said to help in expulsion of worms from the biliary tract and four case reports are given. There are five X-ray pictures.

N. A. Hancock

**1098**—LIN, L. C., CH'EN, K. K. & LIN, Y. C., 1959. [Department of Parasitology, Fukien Medical College, Foochow, China.] "Fluorosis in endemic areas of filariasis in Foochow." **Chinese Medical Journal. Peking**, **78** (5), 446–448.

After a study of 34 filariasis patients with high fluoride intake, Lin *et al.* report that there is no significant correlation between the number of microfilariae in the blood and the amount of

fluoride in drinking water or the amount excreted in 24 hours. They therefore concluded that the intensity of filarial infection does not depend on fluoride intake or systemic storage of this element. Five tables of results are given. N. A. Hancock

\*1099—LIU, H. Y., 1959. [Progress in the prevention and treatment of childhood filariasis.] **Chinese Journal of Pediatrics**, 10 (5), 429–430. [In Chinese.]

1100—LIU, Y. K., TUAN, S. C., JOHN, L. & TUNG, K. H., 1959. [Shanghai First Medical College.] "Intestinal obstruction due to ascariasis." [Abstract.] **Chinese Medical Journal. Peking**, 78 (3), 274.

Liu *et al.* review 128 cases of intestinal obstruction due to ascariasis, commonly seen in the age group of four to seven years. Fever, enteritis, dysentery, administration of vermifuges or physical trauma of the abdomen are the principle factors. Diagnosis conditions are discussed. Oxygen therapy in 11 cases gave good results, and herb medicines from *Quisqualis indica* and *Cortex meliae* showed satisfactory vermifugal effect. Surgical intervention is limited to those who do not respond to medical treatment. N. A. Hancock

\*1101—LOU, Y. T., 1959. [Preliminary observations on treatment of biliary ascariasis with *wu mei* decoction.] **Chinese Journal of Surgery**, 7 (11), 1101–1102. [In Chinese.]

1102—MAI, K., JOHN, L. & YEN, Y., 1959. [Shanghai First Medical College.] "Therapeutic effect of tetrachlorethylene and 1-bromo-2-naphthol in ancylostomiasis." [Abstract.] **Chinese Medical Journal. Peking**, 78 (3), 268.

Stool examinations of 111,287 inhabitants of Shanghai showed that 43.1% had a mixed infection of *Ancylostoma duodenale* and *Necator americanus*. Over 40,000 patients were given either tetrachlorethylene or 1-bromo-2-naphthol, at bedtime without purgatives, for two or three successive nights, the majority being treated at home rather than in hospital. The latter type of patient had a cure rate twice that of home treatment when 1-bromo-2-naphthol was used. This is considered to be due to a short interval between the evening meal and medication at home, which does not occur in hospital. Reactions to both drugs were mild, and 3 ml. per day for three days with tetrachlorethylene or 6 gm. per day with 1-bromo-2-naphthol are suggested. N. A. Hancock

1103—MANSON-BAHR, P., 1959. "The story of *Filaria bancrofti*. A critical review. Part 1. Early history." **Journal of Tropical Medicine and Hygiene**, 62 (3), 53–61.

Manson-Bahr reviews the history of the discovery of *Filaria bancrofti* (commenting adversely on the use of *Wuchereria* as the generic name), of the connection between the parasite and bancroftian filariasis, of the development of the larval stages in mosquitoes, and of the transmission from mosquitoes to man. W. A. F. Webber

1104—MANSON-BAHR, P., 1959. "The story of *Filaria bancrofti*. Part III. Advances in the 20th century." **Journal of Tropical Medicine and Hygiene**, 62 (5), 106–117.

In this third paper of the series, Manson-Bahr deals with the pathogenesis of bancroftian filariasis, diagnosis and the use of skin tests and complement fixation tests, the non-periodic form of the infection which occurs in the Pacific region and the differences between periodic and non-periodic filariasis, and the relation of microfilarial density to the infectivity of appropriate mosquitoes. W. A. F. Webber

1105—MANSON-BAHR, P., 1959. "The story of *Filaria bancrofti*. Part V. Description of *W. bancrofti* and pathology of filariasis." **Journal of Tropical Medicine and Hygiene**, 62 (7), 160–173.

In this, the final article of his series, Manson-Bahr describes and discusses the morphology, distribution, microfilaria, life-span and pathology of *Wuchereria bancrofti*. N. A. Hancock

1106—MARIA, B. DE & ROSSI ESPAGNET, A., 1957. [Istituto di Patologia e Metodologia dell'Università di Roma.] "Osservazioni su alcuni focolai di anchilostomiasi individuati alla periferia di Roma." **Annali della Sanità Pubblica**, 18 (6), 1351–1363. [English, French, German & Spanish summaries pp. 1362–1363.]

Maria & Rossi Espagnet report on four foci of *Ancylostoma duodenale* infection in the outskirts of Rome. The foci comprised 60 persons, 65% of whom had the infection. The incidence



was highest among the age groups of 10 to 19 years and it was higher among females than males. Conditions favouring establishment and maintenance of the foci are discussed as well as sanitation problems.

N. Jones

- 1107**—MAŚLANKA, P., 1957. [II Klinika Chirurgiczna, Akademia Medycyny, Wrocław, Poland.] "Tęgorójec dwunastnicy w zespole wyrostkowo-pęcherzykowym." **Polski Tygodnik Lekarski**, **12** (19), 711-714. [English & Russian summaries p. 714.]

The case history is described of a Korean woman who entered hospital with an inflammatory syndrome of the gastro-intestinal tract (involving also the liver, gall-bladder and appendix) after long-lasting and ineffective treatment. Ancylostomiasis duodenale was finally diagnosed through the presence of eggs in a few of the many faecal and bile examinations made. Treatments with thymol gave no results but carbon tetrachloride, applied four weeks later, cured the complaint. The author points out that under changed geographical conditions an atypical clinical picture often occurs; in Poland anaemia may be entirely absent.

G. I. Pozniak

- 1108**—MICHAEL, K. P. & AVRAMIDES, H., 1957. [Hippokraton Hospital, Athens.] [Photomicrography from coproculture in strongyloidiasis.] **Acta Microbiologica Hellenica**, **2** (3), 164-167. [In Greek: English summary p. 167.]

Michael & Avramides give photomicrographs of larval and mature stages of *Strongyloides stercoralis* obtained from a human subject in Greece. They state that strongyloidiasis must in future be considered as indigenous in Greece.

E. Bennett

- 1109**—NETTEL F., R., 1957. [Campaña Nacional contra la Oncocercosis, S.S.A.-México, D.F.] "Discusión sobre el pronóstico de la oncocercosis." **Medicina. Revista Mexicana**, **37** (771), 203-212. [English summary p. 211.]

Nettel discusses various aspects of the prognosis of onchocerciasis according to such factors as localization of the parasites, the degree and the age of infection.

N. Jones

- 1110**—NIVALDO, J., 1957. [Hospital S. Luiz de Surubim, Pernambuco, Brazil.] "O tetracloretileno associado à essência de quenopódio, no combate à infestação ancilostomótica." **Revista Brasileira de Medicina**, **14** (9), 629-630. [English summary p. 630.]

Nivaldo describes the results of a trial of tetrachlorethylene and oil of chenopodium against ancylostome infections in 12 patients in hospital. Two of the patients continued to pass eggs, one after a course of eleven doses (2.8 c.c. tetrachlorethylene and 0.5 c.c. oil of chenopodium per dose given in ten capsules each day) and the other after six doses. The remaining ten patients stopped passing eggs after about five doses each. The author reports that these results are better than those obtained in an earlier trial using hexylresorcinol but adds that the combination of drugs used in the present trial leaves much to be desired from the point of view of tolerance by the patient.

C. A. Wright

- 1111**—OZERETSKOVSKAYA, N. N., IVANOVA, M. G. & MIKHAILOVA, O. D., 1958. [Klinicheskii Sektor, Institut malyarii, Meditsinskaya Parazitologiya i Gelmintologiya, Ministerstvo zdoravookhraneniya SSR.] [Result of treatment of trichinelliasis with ACTH and cortisone.] **Sovetskaya Meditsina**, **22** (9), 111-119. [In Russian.]

Ozeretskovskaya *et al.* treated nine persons for trichinelliasis with intramuscular injections of ACTH to a total dose of 400 to 900 units. The treatment continued for from two weeks to one month and in one case for 46 days, when the patient had received a total of 1,425 units of the hormone. One of the nine cases had been given a previous course of cortisone treatment. Due to belated diagnosis the person died. It was found that such clinical symptoms as fever, headaches, lack of appetite and facial oedema were reduced during the first week of ACTH treatment, but that the painful muscular and abdominal symptoms persisted. Attempts to reduce the dosage rapidly resulted in swift deterioration of the patients' condition. Side effects included hypertonic crisis, periodical pains in the region of the heart and increase of arterial pressure.

N. Jones

- 1112—PAINE, D. H. D., LOWER, E. S. & COOPER, T. V., 1960. [Coldharbour Hospital, Sherborne, Dorset, U.K.] "Treatment of trichuriasis with dithiazanine in a hospital for mental defectives." *British Medical Journal*, Year 1960, 1 (5175), 770-774.
- A trial group of 12 trichuriasis patients was treated with dithiazanine, 200 mg. orally t.i.d. for five days. Faecal specimens were examined daily for ten days, then one specimen weekly for three weeks. Compared with 12 controls, egg counts in the treated group were reduced to zero and adult worms were eliminated by the sixth day. Later 154 patients and 56 members of the staff (the total including 82 known carriers) were treated with the same dosage. Three months later, all known cases had become negative but after nine months 11 of the 82 had relapsed. 40% of those treated vomited but no other toxic effects were noted.
- W. K. Dunscombe
- 1113—RACHOU, R. G. & FERREIRA, M. O., 1958. [Departamento Nacional de Endemias Rurais, Brazil.] "Nota preliminar sobre o controle quimioterápico da filariose bancroftiana em uma localidade do sul do Brasil." *Revista Brasileira de Malariologia e Doenças Tropicais*, 10 (4), 391-396. [English summary p. 395.]
- Rachou & Ferreira report the preliminary results of a mass trial of the drug hetrazan against *Wuchereria bancrofti* in Ponta Grossa, Santa Catarina, Brazil. In 1953 a survey of the incidence of the disease was carried out and all carriers of microfilariae were treated with the drug at a dosage rate of 6 mg. per kg. body-weight per day for seven days. During the first three years of the follow-up period it was found that the index of infection in the population had fallen but during the fourth year a slight increase was noted. The authors suggest that control of this form of filariasis may be possible by the use of drug treatments at three or two-year intervals. Where the necessary preliminary examinations cannot be carried out with ease they suggest the possibility of achieving control of the disease by single half-yearly doses to all the population.
- C. A. Wright
- 1114—RAHMAN, J., SINGH, M. V. & GUJRAL, J. S., 1957. [Medical and Health Services, Malariology, U.P., India.] "Investigation of filariasis problem in Ballia town (Uttar Pradesh)." *Indian Journal of Malariology*, 11 (2), 163-167.
- The blood of 3,179 inhabitants was examined in a filarial survey and 12.05% were found to be infected with *Wuchereria bancrofti*, with an average of 28.19 microfilariae in 20 cu. mm. blood. 34.47% of the persons showed disease symptoms, the chief one being hydrocele. *Culex fatigans* was the main vector, 4.6% of which were found to be positive for various stages of larval development.
- N. A. Hancock
- 1115—ROOK, H. DE, 1957. "Filariasis on the Island of Pam (South Waigeo District, West New-Guinea)." *Documenta de Medicina Geographica et Tropica*, 9 (3), 197-212.
- De Rook presents a detailed report on filariasis in the 250 inhabitants of the island of Pam in the Dampier Strait. *Inter alia* he mentions that the infection rate with microfilariae of *Wuchereria bancrofti* was 26.8%, the filarial disease rate 14.8% and the average number of microfilariae per infected person 37 in 15 cu. mm. of blood. In cases with clinical manifestations hydrocele was the most prevalent sign. Elephantiasis occurred in 9.5% of adults. The incidence of both filarial disease and filarial infection increased with age, reaching a maximum in the 41-50 year group. The chief vector is *Anopheles farauti*. *Aedes kochi*, *Culex fatigans* and *C. annulirostris*, which also occur, are of relatively minor importance.
- J. M. Watson
- 1116—SASA, M., HAYASHI, S., SATO, K., IKESHOJI, T. & TANAKA, H., 1959. [Department of Parasitology, Institute for Infectious Diseases, University of Tokyo, Japan.] "A review of field experiments in the control of bancroftian and malayan filariasis in Japan, 1958." *Japanese Journal of Experimental Medicine*, 29 (5), 369-405.
- Sasa *et al.* discuss attempts to control human filariasis in ten different areas in south-western Japan where the incidence ranged from 0.48% to 30.3%. *Wuchereria bancrofti* was responsible in all except one area, Hachijo-Koshima Island, which was endemic for *W. malayi*. Treatment was carried out in conjunction with control of the vectors. Different regimes of supantonin tablets (diethylcarbamazine) were tested and the results compared: (i) 20 mg. per kg. body-weight of diethylcarbamazine, divided into ten successive daily doses. This reduced the



microfilarial count to 7.86% of the initial number with 20.9% of cures, as examined just after the treatment. In two other areas five successive daily doses of 2 mg. per kg. were followed by 4 mg. per kg. for five successive days. The first part of this treatment reduced the microfilarial count to as low as 1.57% of their original level and 48.7% of the carriers became negative. The second part of the treatment gave no significant improvement. Some months later these counts were about 10% of the pre-treatment value. (ii) 2 mg. per kg. given once weekly for 10 successive weeks reduced the microfilarial counts to 3.9% of the original level. The same dose given ten times at monthly intervals was not effective. (iii) A daily dose of 2 mg. per kg. for five successive days, followed by the same dose at weekly intervals for ten weeks, reduced the average microfilarial count to 0.78% of the pre-treatment level and the number of infected persons was reduced by 61.7%. However, the microfilarial count reached 3.52% of its former value after three months. Residual spraying with D.D.T. or dieldrin, which controlled mosquitoes for considerable periods, was carried out but there were some signs of acquired resistance to insecticides. The order of effectiveness against *Culex pipiens pallens* larvae was: parathion, dieldrin, diazinon, DDVP, aldrin and D.D.T. N. Jones

**1117**—SICIŃSKI, A., 1957. [I Klinika Chorób Wewnętrznych, Warszawa, ul. Nowogrodzka 59, Poland.] "W sprawie leczenia tęgoryjcowatości dwunastnicy heksylrezorcynolem." **Polski Tygodnik Lekarski**, 12 (44), 1694–1695. [English & Russian summaries p. 1695.]

*Ancylostoma duodenale* infections were treated in ten patients in a Korean hospital with 1 gm. of hexylresorcinol, given on an empty stomach and followed by a laxative two hours later and no food for a further five hours. This treatment was repeated three times at two-day intervals. The symptoms receded in all the patients and seven were cured, showing no eggs in the faeces on at least two consecutive days. No toxic side effects were observed. G. I. Pozniak

**\*1118**—SUN, C. C. & HSIEH, C. L., 1959. [Tropical eosinophilia: report of 27 cases.] **Chinese Journal of Internal Medicine**, 7 (6), 555. [In Chinese.]

Sun & Hsieh report that infection with hookworm, *Ascaris lumbricoides* or *Trichuris trichiura* was found in 74% of 27 cases of tropical eosinophilia. The main clinical symptoms were of respiratory character. Dichlorophenarsine administered intravenously was found to be an ideal treatment. [Based on an abstract in **Chin. med. J. Peking**, 79, 88.] N. Jones

**\*1119**—TS'AO, M. K. & LI, C. T., 1957. [Treatment of filarial chyluria with traditional Chinese drugs.] **National Medical Journal of China**, 43 (10), 809–810. [In Chinese.]

**\*1120**—TSU, P. L. ET AL., 1959. [One-day regime of hetrazan in treatment of filariasis.] **Chinese Journal of Internal Medicine**, 7 (10), 968–970. [In Chinese.]

**1121**—T'UNG, S. T. & CHOU, T. Y., 1959. [Departments of Surgery and Traditional Medicine, Hofei First People's Hospital, Anhwei.] "Acupuncture combined with traditional drug Wu Mei T'ang in treatment of biliary ascariasis." **Chinese Medical Journal, Peking**, 78 (6), 542–544.

48 cases of biliary ascariasis were treated by dosing with *wu mei t'ang* [a decoction of traditional Chinese herbs, formula given] and applying acupuncture. All patients are said to have been cured. Surgical procedure is considered to be less satisfactory and more risky than acupuncture. Ancient Chinese history says that *wu mei t'ang* is an effective ascaricide and the authors concur with this belief, pointing out that while acupuncture alone was effective in stopping abdominal pain, the relief was only temporary. N. A. Hancock

**1122**—VELLIEUX, M., RIT, J. & LE BRETON OLIVEAU, G., 1957. [Institut d'Ophthalmologie Tropicale de l'A.O.F.] "Réflexions sur l'onchocercose oculaire africaine." **Annales d'Oculistique**, 190 (8), 576–586.

Vellieux *et al.*, summarizing their experience comprising 540 cases of ocular onchocerciasis, discuss first of all the evolution of the symptomatology and anatomic-pathological changes. The evolution of the disease is subdivided into initial and secondary or degenerative stages. In this second stage the lesions are irreversible. Therapeutic and prophylactic difficulties are pointed out. Thus some three months' observation of 416 cases out of the total 540 after the classic treatment with notezine and moranyl did not reveal any improvement. In a campaign

against the disease in French Equatorial Africa, carried out in 1955 and directed to treatment of the carriers and control of *Simulium damnosum*, proved local vector of *Onchocerca volvulus* infection, it was found that lindane (gamma isomer of hexachlorocyclohexane) was at least five times as effective an insecticide as D.D.T. in the same quantities. It was, however, particularly toxic to the fish.

N. Jones

1123—WANG, C. Y., 1959. [Szechuan Medical College, Chengtu, China.] "Studies on ancylostomiasis in New China." **Chinese Medical Journal. Peking**, 78 (3), 257-266.

Wang gives an account of the results of researches made on hookworm infection in recent years in China under the following heads: distribution; relationship between crop cultivation and infection; optimum seasons for infection; eradication of ova in nightsoil; treatment; diagnosis and ova count; and control. Up to the end of 1958 hookworm disease had been basically eradicated in 22 hsien and cities. [This paper ably summarizes the present status of anti-hookworm work in China and merits perusal in the original.]

J. M. Watson

1124—WANG, C. Y., WANG, H. C., PENG, Y. F. & CHAO, Y. A., 1959. [Szechuan Medical College.] "Studies on the control of hookworm. III. Observations on the effect of urine on hookworm ova in the feces." [Abstract.] **Chinese Medical Journal. Peking**, 78 (3), 269-270.

Human and horse urine mixed with faeces showed a higher ovicidal effect than water alone upon hookworm eggs, and were more effective in hot than cold seasons. Fresh urine had a more marked effect than old samples and a higher urea and ammonia content was better than a low one. The action of urine was found to be closely related to the stages of development in hookworm ova.

N. A. Hancock

\*1125—WANG, H. K. ET AL., 1957. [Biliary ascariasis: report of 402 cases.] **National Medical Journal of China**, 43 (10), 789-792. [In Chinese.]

1126—WHITE, P. L. ET AL., 1957. [Council on Foods and Nutrition, American Medical Association, Chicago, Ill., U.S.A.] "Effects of iron treatment of anemia in a tropical area." **American Journal of Clinical Nutrition**, 5 (6), 621-628.

White *et al.*, working in a Peruvian jungle area, administered ferrous sulphate in several different dosage schedules daily for periods up to 14 weeks to a large group of anaemic primary schoolgirls of whom 75% were infected with *Ascaris lumbricoides*, 81% with *Trichuris trichiura*, 91% with hookworm and 31% with *Strongyloides stercoralis*. Degrees of anaemia below 10 gm. haemoglobin per 100 ml. were directly related to the hookworm load. Relatively small increases in iron intake proved to be beneficial, the most anaemic children showing the greatest response. It is concluded that means should be sought to increase dietary iron intake.

J. M. Watson

1127—YAMATO, A., NAKAI, T., YAMAGUMA, K. & KAMIDA, K., 1959. [Kumamoto City Hospital, Kumamoto, Japan.] [Four cases of human gnathostomiasis.] **Journal of the Kumamoto Medical Society**, 33 (8), 1539-1541. [In Japanese.]

Four cases of human gnathostomiasis were found, which were supposed to have become infected by eating *Ophicephalus tadianus* from the Kikuchi River in Kumamoto Prefecture. Eosinophilia was noted in all cases.

Y. Yamao

\*1128—YEH, Y. P. ET AL., 1957. [Report on an investigation into filariasis in a district of Foochow city.] **Chinese Journal of Hygiene**, 5 (5), 309. [In Chinese.]

\*1129—YÜ, T. H. ET AL., 1959. [Treatment of enterobiasis and ascariasis with piperazine citrate.] **Chinese Journal of Pediatrics**, 10 (2), 152-155. [In Chinese.]

361 children with enterobiasis were given piperazine citrate at the dosage of 50 mg. piperazine hexahydrate per kg. body-weight daily for 10 days and then twice a week for four weeks, with a 99.4% effective result. The drug was given as a prophylactic to close contacts with good results. 138 cases with ascariasis were given 160 mg. per kg. (maximum dose 3 gm.) daily for one or two days with effective results of 80.3% and 86.2% respectively. [Taken from an abstract in **Chin. med. J. Peking**, 78, 392.]

N. A. Hancock



## Nematomorpha

*No relevant abstracts in this issue*

## Hirudinea

\*1130—CHANG, N. W., 1959. [Fish bile in the treatment of leech in the nose: a case report.] **Chinese Journal of Otorhinolaryngology**, **7** (1), 17–18. [In Chinese.]

1131—PESSAH, S. D., 1957. [Alexandropolis, Greece.] “Corps étrangers rares du larynx. (Sangues.)” **Annales d’Oto-Laryngologie**, **74** (9), 681–683.

Pessah has encountered in Athens four cases of leeches in the larynx. In each of the two cases which are described the organ was occluded by a leech which was attached to the sub-glottis. Symptoms developed gradually; dyspnoea was intense but did not necessitate tracheotomy; after extraction of the leech by indirect laryngoscopy symptoms abated with sensational rapidity. [The identity of the leeches is not stated.]

N. Jones

## Pentastomida

See also No.: 1384.

1132—HUNTER, W. S. & HIGGINS, R. P., 1960. [Zoology Department, Duke University, Durham, North Carolina, U.S.A.] “An unusual case of human porocephaliasis.” **Journal of Parasitology**, **46** (1), 68.

An unencapsulated third-stage larval pentastomid—*Linguatula serrata*—was removed from the anterior chamber of the eye of a 16-year-old negro boy from Virginia. The parasite, which was first noticed about one month prior to hospitalization, produced slight reddening of the eye but no pain. There was no other evidence of parasitism in the patient and the source of infection was not elucidated.

J. M. Watson

## Miscellaneous

See also Nos.: 1203, 1409, 1410, 1411, 1423, 1436, 1527.

\*1133—CHANG, Y. C., 1959. [Parasitic infestations of the brain; a review of the literature.] **Chinese Journal of Neurology and Psychiatry**, **5** (5), 328–330. [In Chinese.]

Chang reviews the literature on parasitic infections of the brain for the past ten years. A total of 348 cases of cerebral paragonimiasis had been reported. The average lapse of time between infection and the appearance of cerebral symptoms was 16·4 months. 1·74% to 4·29% of the total number of schistosomiasis cases in hospital were of the cerebral type, totalling 57 cases; only three of these were females. 89 cases of cerebral cysticerciasis were reported with a male to female ratio of 8:1. [Based on an abstract in **Chin. med. J. Peking**, **79**, 566.] N. Jones

1134—FOSSATI, C., 1959. [Casa di Cura “Villa dei Pini”, Urago di Tavernerio (Como), Italy.] “Síndromes hipereosinofílicos. (Síndrome de Loeffler y eosinofilia tropical.)” **Revista Ibérica de Parasitología**, **19** (4), 369–389. [English summary p. 389.]

Fossati reports ten cases of hypereosinophilia from Northern Argentina. Faecal examinations of these patients were negative even when repeated later to allow time for larval worms that might have been present to develop.

M. McKenzie

1135—HOU, T. C., CHUNG, H. L., HO, L. Y. & WENG, H. C., 1959. [Sino-Soviet Friendship Hospital, Peking, China.] “Achievements in the fight against parasitic diseases in New China.” **Chinese Medical Journal. Peking**, **79** (6), 493–520.

Hou *et al.* quote an extensive bibliography summarizing the achievements and problems of the control of parasitic diseases in New China.

N. Jones

- 1136**—MARWAH, S. N., 1958. [D.M.O. Health, Sultanpur (Oudh), U.P., India.] "An experiment in interruption of man-to-man faecal and helminthic circulation in rural community." **Journal of the Indian Medical Association**, **31** (10), 403-408.

Marwah reviews the types of rural latrines available and describes his conclusions from an intensive sanitation drive conducted in selected villages in which various modifications (illustrated) of the Lal type latrine were installed. The creation of a demand for latrines is an essential preliminary to fitting them up. A planned scheme is required for the prevention of soil pollution on the same lines as existing schemes for malaria eradication, filariasis control and the provision of safe drinking water supplies. To this end a proper method for health education must be developed and further experimentation with standardization of suitable sanitary equipment needs to be carried out.

J. M. Watson

- 1137**—SEATON, D. R., 1958. [Liverpool School of Tropical Medicine.] "The present-day importance of parasitic infections of man." **British Journal of Clinical Practice**, **12** (12), 872-876.

Seaton briefly and simply reviews (*inter alia*) the present status of knowledge in respect of human schistosomiasis, hookworm disease, ascariasis, enterobiasis, filariasis and onchocerciasis. He concludes that the control of schistosomiasis is the major problem of human helminthic disease, and that its solution awaits the discovery of an efficient snail poison and an effective drug suitable for mass treatment.

J. M. Watson

- 1138**—WANTLAND, W. W., 1959. [Illinois Wesleyan University, Bloomington.] "Present status of man as host to animal parasites." **Transactions of the Illinois State Academy of Science**, Year 1958, **51** (1/2), 3-16.

This is a popular article dealing with some recent achievements in the field of medical parasitology. The author urges co-operative measures for the conquest of parasitic disease.

J. M. Watson

## VETERINARY HELMINTHOLOGY

### Horses, Donkeys and Mules

See also Nos.: 1382, 1535, 1536.

- 1139**—ANTEPLIOGLU, H., 1958. "Bir atta soğuk topallıkla seyreden paraziter tendinitis vak'ası." **Türk Veteriner Hekimleri Derneği Dergisi**, **28** (146/147), 48-51.

*Onchocerca reticulata* has been found in the legs of horses in Turkey and was removed surgically.

T. Öden

- 1140**—GIBSON, T. E., 1960. [Central Veterinary Laboratory, Weybridge, Surrey, U.K.] "Some experiences with small daily doses of phenothiazine as a means of control of strongylid worms in the horse." **Veterinary Record**, **72** (3), 37-41.

A pregnant mare was given 1 gm. of phenothiazine daily until the faecal egg count dropped to zero. She was then placed on a clean paddock and the regimen continued until and after the foal was born 7 months later. The foal was not dosed and faecal samples were taken from it and the mare until the foal was slaughtered a year later. Ova appeared in the foal faeces 26 weeks after birth and reached 100 per gm. before death, whereas they remained scanty and rare in the mare faeces. On post-mortem the foal was found to have 638 *Trichonema* spp. and nine *Strongylus vulgaris*. By comparison, a foal running with untreated horses acquired a higher burden at an earlier stage, but Gibson considers it impossible to raise a foal entirely free from strongylid worms. Another horse, which was placed on the same regimen of phenothiazine, showed an initial rapid drop in faecal egg count, followed by a gradual rise, the ova being solely those of *Trichonema* spp. The horse had some years previously been given the same dosage of phenothiazine for 12 months [see also Helm. Abs., **18**, No. 123d]. Gibson considers the results of the latest experiment show that at the beginning some of the worms were resistant to small doses of phenothiazine and that either they became increasingly resistant



or that the proportion of resistant worms increased. However, he does not believe that the continued use of small doses in the horse will always result in the production of phenothiazine-resistance in its worms.  
N. A. Hancock

**1141**—LEBAILLY, J. & CADILLAC, G., 1957. "Péritonite septique par rupture intestinale parasitaire sur un cheval arabe-barbe." *Revue du Corps Vétérinaire de l'Armée. Paris*, 12 (1), 12-13.

Lebailly & Cadillac discuss the method of penetration of ascarids through the intestinal wall as observed during post-mortem of a horse. In the case described, two specimens were found encysted in the mesentery, near the small intestine, and one attached to the parietal peritoneum. It is supposed that the rupture was due to direct action of the parasites.  
N. Jones

**1142**—RAI, P. & SRIVASTAVA, J. S., 1959. [U.P. College of Veterinary Science and Animal Husbandry, Mathura, U.P., India.] "A preliminary report on the survey of nematode parasites of horse (*Equus caballus orientalis*). [Correspondence.] *Science and Culture. Calcutta*, 24 (7), 329-330.

Rai & Srivastava report that 26 nematode species were recovered from ponies at the U.P. College of Veterinary Science and Animal Husbandry. [Only 25 species are listed.] Among these parasites were: *Parascaris equorum*, *Oxyuris equi*, *Habronema muscae*, *H. microstoma*, and *H. megastoma*. The others belonged to the Strongylidae and Trichonematidae. *Trichonema (Cylicocercus) alveatum* has been recorded for the first time in India.  
N. Jones

**1143**—VUKOVIĆ, V., 1959. [Medical Clinic of the Veterinary Faculty, University of Sarajevo.] "Prilog poznavanju parazitaranih oboljenja kopitara." *Veterinaria. Sarajevo*, 8 (2), 259-263. [English summary p. 259.]

Vuković reports that out of 1,672 horses examined at the veterinary clinic of the Sarajevo University, from 1952 until 1958, 3.4% were infected with ascarids, 17.4% with strongyles, 3.8% with oxyurids and 0.23% with *Anoplocephala*. The percentages of cases where the infection was the primary cause of the disease were: parascariasis 0.2%, strongylosis 9.2% and oxyuriasis 0.05%. Clinical symptoms as well as some aspects of treatment are also described.  
N. Jones

## Cattle

See also Nos.: 1382, 1397, 1400, 1426, 1428, 1448, 1459, 1505, 1545, 1576.

**1144**—CONDY, J. B., 1960. [Veterinary Research Laboratory, Salisbury, Southern Rhodesia.] "An observation on the efficiency of some anthelmintics against *Fasciola gigantica*." [Correspondence.] *Veterinary Record*, 72 (10), 196.

Condy compared the effect on *Fasciola gigantica* infection in 243 cattle of (i) hexachlorethane suspension; (ii) mixed hexachlorethane and phenothiazine suspensions and (iii) carbon tetrachloride in oil (5 c.c. in 20 c.c. arachis oil). All cattle were slaughtered after 21 days and 25.5% were considered to have been infected with *F. gigantica* before treatment. It was concluded that none of the drugs used was fully effective but that the pure hexachlorethane suspension was probably more effective than the other two. A table is given showing the percentage elimination of flukes with each treatment.  
T. J. Coyle

**1145**—DELFINO, F., 1957. "Sindromi dei vitelli attribuite a strongiloidiasi." *Veterinaria. Milan*, 6 (5), 179-188; (6), 234-240. [English, French & German summaries p. 239.]

Delfino describes a syndrome in calves consisting of intestinal, respiratory, cardiac and muscular symptoms, which he believes to be due to *Strongyloides vituli* [papillosus] infection combined with a particular neurocrine condition of the animals. As an example of this syndrome he cites pathogenesis caused by strongyloid infection in beef calves, which were found to be predisposed to vagotonia.  
N. Jones

**1146**—DEMIDOV, N. V. & VESELOVA, T. P., 1959. [Vsesoyuzni institut gelmintologii imeni akademika K. I. Skryabina.] [Treatment of fascioliasis in cattle.] *Veterinariya*, 36 (12), 12-13. [In Russian.]

Demidov & Veselova, after referring to successful intramuscular application of carbon tetrachloride in the treatment of fascioliasis in cattle [for abstract see *Helm. Abs.* 28, No. 69e],

report good tolerance by over 10,000 treated cattle. Only one heavily infected animal with signs of atonicity had to be slaughtered ten hours after treatment. N. Jones

1147—DEOUELL, J., 1957. [Department of Animal Husbandry and Veterinary Services, Jerusalem.] [Problems of *Cysticercus bovis* in general and in frozen meat plants in Abyssinia and Eritrea in particular.] **Refuah Veterinarith**, 14 (2), 57–63. [In Hebrew: English version pp. 103–108.]

Deouell discusses the general incidence of cysticerciasis bovis in cattle and the relative efficacy of routine methods of meat inspection for this infection. He concludes that imported meat of African origin should be rendered safe by adequate refrigeration. It is mentioned *inter alia* that the incidence of cysticerciasis bovis in Israel is only 0.5% in cattle raised on Jewish farms, but reaches 2.6% in local cattle originating from areas with a mixed population. J. M. Watson

1148—GAVEZ, E. & MAGLAJLIĆ, E., 1959. [Institute for Pathology of the Veterinary Faculty, University of Sarajevo.] “Carcinoma polymorphocellulare primarium (cholangio- et hepatocellulare atque anaplasticum) hepatis goveda u asocijaciji sa fascioloznom cirozom.” **Veterinaria. Sarajevo**, 8 (2), 235–240. [English summary p. 235.]

Gavez & Maglajlić describe a case of primary carcinoma from a bovine, in association with *Fasciola* cirrhosis. It was not established whether carcinoma was due to the heavy fluke infection or to some other factor. N. Jones

1149—HOVORKA, J., 1959. [Zaklad Helminтологии, Slovacka Akademie Nauk, Košice, Czechoslovakia.] “Badania nad telazjozą bydła rogatego w Czechosłowacji.” **Wiadomości Parazytologiczne**, 5 (4/5), 379–388. [German summary pp. 387–388.]

*Thelazia* was found in 723 of 2,621 cattle examined (a large proportion post mortem) during 1954–58 in the Carpathian Mountain area of Czechoslovakia. *T. rhodesii* was responsible for 70.62% of the infections, *T. skrjabini* for 18.76% and *T. gulosa* for 10.6%. The last two species were found for the first time in that country. The intensity and rate of *T. rhodesii* infections were highest in October and November and lowest in June. 92.1% of clinical outbreaks occurred during the pasturing period. The infection intensity rose with the age of the animals up to their tenth year. Forest-steppe areas were more affected than foot-hill and mountain areas. G. I. Pozniak

1150—KARLYUK, A., 1959. [Some data on *Fasciola* infections in slaughtered cattle.] [Abstract.] **Veterinariya**, 36 (6), 42. [In Russian.]

At a slaughterhouse in the Khmelnitsk region the greatest losses of meat were due to fascioliasis. 36.3% of livers, i.e. over ten tons of meat produce, were rejected in one year. At the same time only 0.02% of meat products were rejected due to cysticerciasis. G. I. Pozniak

1151—KOVERMANN, B., 1957. [Klinik für innere und chirurgische Rinderkrankheiten, Richard-Götze-Institut der Tierärztlichen Hochschule Hannover, West Germany.] “Beitrag zur Behandlung der Lungenwurmerkrankung des Rindes mit Aerosolen.” Dissertation. Hanover, 76 pp.

Kovermann deals with the treatment of lungworm infection in cattle by aerosol therapy. Various aerosols were examined which include chenopodium oil, colloidal iodine, Antimosan and Tasnon, a piperazine hydrate compound. It was shown that the most effective treatment was the administration of chenopodium oil as a 60% to 70% suspension which was effective against varying degrees of infection. K. Heath

1152—MAMEDOV, A. K., 1959. [An unusual localization of *Cooperia punctata* (Linstow, 1906) in the pancreas of zebu cattle.] [Abstract.] **Veterinariya**, 36 (6), 43. [In Russian.]

*Cooperia punctata* was present in the pancreas of 4 out of 14 zebu cattle examined. From 3 to 132 worms were found per animal. G. I. Pozniak

1153—PODLESNI, G. V., 1959. [Volynskaya oblvvetbaklaboratoriya.] [Massive infection of young cattle with *Paramphistomum*.] **Veterinariya**, 36 (6), 29–31. [In Russian.]

Podlesni describes an outbreak of massive paramphistomiasis among young cattle at some co-operative farms in the Western Ukraine. Copper sulphate solution, hexachlorethane and phenothiazine were administered but failed to cure. Prophylactic measures, concerning grazing methods, against this infection under the local conditions are recommended. N. Jones



- 1154**—ROSE, J. H., 1959. [Ministry of Agriculture, Fisheries and Food, Central Veterinary Laboratory, Weybridge, U.K.] "*Nematodirus helvetianus*, an intestinal worm of cattle." **Veterinary Record**, **71** (23), 470–472.

A brief redescription of *Nematodirus helvetianus* is given and its differentiation from the three other species of *Nematodirus* recorded from bovines in the U.K. is discussed. Because of the similarity of the female *Nematodirus helvetianus* to that of *N. spathiger*, and of the male to that of *N. filicollis*, information on the incidence of these four species which has been obtained from routine post-mortems is unreliable, although *N. battus* is more easily distinguished. In view of the incidence of *N. helvetianus* in America, it is suggested that it may be more common in Britain than present records indicate.

D. Mettrick

- 1155**—ROSS, J. G., ARMOUR, J. & LEE, R. P., 1959. [Federal Veterinary Research Laboratory, Vom, Nigeria.] "The effect of phenothiazine on serum albumen levels and erythrocyte values of Nigerian zebu cattle." **Veterinary Record**, **71** (23), 477–480.

Details of three experiments using a total of eleven zebu cattle are reported. The experiments were designed to determine the effect of therapeutic and massive doses of phenothiazine on serum albumin erythrocyte values in cattle. Toxic doses of phenothiazine were shown to produce a lowering of the serum albumin level. The fall is markedly affected by the condition of the animal and nutrition, i.e. low-level or low-protein. It is suggested that a drastic lowering of the serum albumin would reduce the osmotic pressure to such an extent that fatal shock would occur. The critical level for serum albumin in zebu cattle is around 1.3 gm. per 100 ml. (electrophoretic analysis method). After dosing an alteration in erythrocyte values occurred, and sometimes a macrocytic anaemia developed. Neither the alteration nor anaemia was considered significant.

D. Mettrick

- 1156**—SCHMID, M., 1958. [Macello comunale, Trieste.] "Osservazioni sulla frequenza della cisticercosi bovina al macello di Trieste." **Veterinaria Italiana**, **9** (11), 904–908.

Schmid, in a report on bovine cysticerciasis in the Trieste abattoir, points out the importance of examining the external and internal masseter muscles, which revealed a total of 18 cases of cysticerciasis from 1956 to 1958. In 1958 of 2,757 cattle slaughtered 11 were infected. The greatest incidence was found in June. No cysticerciasis occurred in 8,477 slaughtered calves imported from the provinces and 26 others, slaughtered at the abattoir, in which the examinations were limited to the heart.

N. Jones

- 1157**—ŚWIETLIKOWSKI, M., 1959. [Zakład Parazytologii, Polska Akademia Nauk, Warszawa, Poland.] "Badania nad robaczycą płucną bydła w Polsce." **Wiadomości Parazytologiczne**, **5** (4/5), 361–366. [English summary p. 366.]

Świetlikowski notes that dictyocauliasis in cattle is a recent problem in Poland. The first enzootic outbreak was noted in 1948 in Żuławy; the infection has since spread to most low-lying coastal and inland areas. He reviews relevant Polish publications and outlines the direction which, in his opinion, future control should take.

G. I. Pozniak

- 1158**—VARAZANASHVILI, M. S., 1959. [*Bunostomum* infection in calves.] [Abstract.] **Veterinariya**, **36** (6), 42. [In Russian.]

Calves on a collective farm were observed to survive *Bunostomum* infections; 94% of the stock became infected and of these 28% died. The clinical symptoms and pathological changes are briefly described. Phenothiazine in doses of 0.5 gm. per kg. body-weight cured 54 of 58 calves treated; the worming was associated with additional treatment of the clinical symptoms. Tin arsenite, kamala, osarsol, hexachlorethane and santonin proved ineffective.

G. I. Pozniak

- 1159**—VARGES, W., 1957. [VEB Vieh- und Schlachthof, Dresden, East Germany.] "Intensivierung der Finnenschau—ein Beitrag zur Lösung des Rinderfinnenproblems." **Monatshefte für Veterinär Medizin**, **12** (12), 320–321.

The present meat inspection regulations in Dresden require that the tongue, heart, outer and inner masseter muscles, digestive tract and any muscle parts disclosed at the slaughter of cattle, be examined for cysticercus. Considering these regulations insufficient, Varges, after verification on 1,000 cattle of the usefulness of possible improvements, proposes that the

regulations be emended to demand the examination of the heart by two crossed cuts, of the ventral tongue muscles, of the oesophagus after removal of the trachea and of the diaphragm after removal of the serous membrane.

G. I. Pozniak

### Sheep and Goats

See also Nos.: 1370, 1373, 1382, 1397, 1400, 1412, 1480, 1494, 1505, 1563, 1568.

**1160**—DICKSON, G. R., 1960. [Fitzalan-Howard Estates Ltd., Worthing, Sussex.] "Intensive grazing of sheep." *Agriculture, London*, **66** (10), 446-449.

Dickson describes experiments designed to overcome the disadvantages of rotational grazing of sheep, and the involved relationship with worm infection. In ordinary rotational grazing, the beneficial effect of alternation of grazing periods and pasture, which rests in interrupting the cycle of reinfection, may be nullified by heavier contamination of the sward at higher stocking levels and increase of larval uptake by close grazing. The nutritional advantages of creep grazing strengthen the resistance of the lamb to worm infection and uptake of infective material by lambs is reduced, since it is the resistant ewes which ingest the heavily infected lower regions of the sward. Rotational creep grazing, giving the lambs access to the pasture ahead of the ewes, as compared with ordinary rotational grazing, gave improved condition, an additional live-weight gain of 11 lb. per lamb, and a 50% reduction in worm burden (*Nematodirus* spp. *et al.*) during a 14-week suckling period in 1956. Application of the system on a commercial scale in 1958 led to the sale before weaning of 98 lambs averaging 42 lb. dressed carcass weight, realizing £7 7s. 6d. a head plus the guarantee payment. The system may provide an economic alternative to dairying.

J. M. Watson

**1161**—EGOROV, Y. G. & BOBKOVA, A. F., 1959. [The use of calcium arsenate in the control of *Moniezia* infection in sheep.] [Abstract.] *Veterinariya*, **36** (6), 41. [In Russian.]

Akramaski, Egorov and Bashkirtseva [see *Ovtsevodstvo*, 1956, 8, p. 46] had obtained experimentally 100% efficacy against monieziasis in lambs, using calcium arsenate in doses of 0.3 gm. for two-month-olds, 0.4 gm. for three and four-month-olds and 0.5 gm. for five to six-month-olds. This anthelmintic proved less toxic than Paris green. The present authors have treated 540 infected lambs on six farms. Calcium arsenate (gelatin capsules) in the above dosages was administered in the morning on an empty stomach. Two hours after dosing the animals were allowed on pasture. On examination ten days later the efficacy was 100% and 45 days later it was 84.6% to 93.6%.

G. I. Pozniak

**1162**—EMERICK, R. J., BEMRICK, W. J., POPE, A. L., HOEKSTRA, W. G. & PHILLIPS, P. H., 1957. [South Dakota State College, Brookings, South Dakota, U.S.A.] "The effect of mineral and phenothiazine supplementation on the resistance of grazing lambs to *Haemonchus contortus* infection." *Journal of Animal Science*, **16** (4), 937-942.

Calcium hydrogen phosphate and phenothiazine given with trace mineralized salt, resulted in an alleviation of the effects of *Haemonchus contortus* infection in grazing lambs and in a reduction of the number of eggs of the parasite in the faeces. The best results were obtained when both drugs were added simultaneously.

N. Jones

**1163**—GADZHIEV, Y. G., 1958. [Epizootiology of dictyocauliasis of sheep in Nakhichevan A.S.S.R.] *Izvestiya Akademii Nauk Azerbaidzhanskoi SSR. Seriya Biologicheskikh i Selskikh Khozyaistvennikh Nauk*, Year 1958, No. 4, pp. 53-61. [In Russian.]

In the Nakhichevan A.S.S.R. the highest infection with *Dictyocaulus filaria* of yearling and adult sheep occurred in January-March and the lowest in August-September. In lambs the infection was first observed in August and rose to a peak in October-November. On pastures which were used in the winter, the larvae developed to infectivity in seven to 16 days in October-November and six to 14 days in April-May. During December-March the larvae died within four to 16 days. In June on mountain pastures, the development was completed in eight to 10 days.

G. I. Pozniak



- 1164**—KATES, K. C., WILSON, G. I. & TURNER, J. H., 1957. [Animal Disease and Parasite Research Branch, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Md.] "Pathogenic effects of experimentally induced infections of three species of stomach worms which parasitize sheep." [Abstract.] **Proceedings of the Association of the Southern Agricultural Workers, 54th Annual Convention (1957)**, pp. 90–91.

Weight gains were most depressed in those lambs which were simultaneously infected with *Haemonchus contortus*, *Ostertagia circumcincta* and *Trichostrongylus axei*. However, only lambs with a pure infection of *H. contortus* developed a marked anaemia. The presence of one or both of the other two parasites had a definite depressing effect on populations of *H. contortus*. A similar, but less marked, effect was observed on *O. circumcincta*. *T. axei* did not seem to be affected by the presence of the other two species. N. Jones

- 1165**—KESLER, V., 1959. [The prophylactic use of Paris green against cestodes in sheep.] [Abstract.] **Veterinariya**, **36** (6), 41. [In Russian.]

Thirty thousand sheep were treated for cestode infection with Paris green in doses of 0.5 gm. for lambs, and 0.6 gm. and 0.7 gm. for ewes and rams over the age of two years. The anthelmintic was mixed with water in the proportion of 4:1. [The results of the treatment are not given.] G. I. Pozniak

- 1166**—LANDAU, M., 1957. [Veterinary Services, Rehovot, Israel.] [An outbreak of *Coenurus cerebralis* in a flock of lambs.] **Refuah Veterinarith**, **14** (2), 66–67. [In Hebrew: English summary p. 101.] Landau reports on an outbreak of *Coenurus cerebralis* infection, affecting some 5% of 300 eight to ten-month-old lambs. The usual symptoms of the infection were observed except "circling". N. Jones

- 1167**—LAVROV, O. B., 1959. [*Chabertia* disease in sheep.] [Abstract.] **Veterinariya**, **36** (6), 41. [In Russian.]

Lavrov reports an enzootic outbreak of *Chabertia* disease among sheep in Dagestan and describes the accompanying clinical symptoms. Good results of treatment were obtained with deep enemata of 800 to 1,000 ml. of 1% formalin solution. G. I. Pozniak

- 1168**—LIKHOVOZ, L. K., 1959. [Evaluation of a local method of control of *Dicrocoelium* infections in sheep.] [Abstract.] **Veterinariya**, **36** (6), 42. [In Russian.]

Likhovoz had made experiments to test whether sheep pastured on fields after the tobacco harvest or fed on tobacco leaves become free of *Dicrocoelium* infection. His results led him to the conclusion that there is no justification for this theory. G. I. Pozniak

- 1169**—LUNGU, V., 1959. "Die Leberegelseuche in der Rumänischen Volksrepublik (Epizootologie und Bekämpfung)." **Wiadości Parazytologiczne**, **5** (4/5), 345–355. [Polish summary pp. 354–355.]

Before 1955 losses of sheep due to liver-fluke infection were small in Rumania. Subsequent seasons of rains and mild winters were followed by acute outbreaks of infection in many areas. 18% of stock were lost in 1956. This has led to the introduction of planned treatment together with anti-snail spraying of pastures (with copper sulphate) and other prophylactic measures. An appropriate control campaign is outlined based on the experience gained. G. I. Pozniak

- 1170**—MIRZAEV, T., 1959. [Control of fascioliasis in sheep.] [Abstract.] **Veterinariya**, **36** (6), 41. [In Russian.]

On the collective farm "Pobeda", 120 sheep were lost due to fascioliasis in 1956 and 135 in 1957. Treatment by ruminal introduction of carbon tetrachloride in November 1957 and again in February and May 1958, prevented any further losses in 1958 among the remaining stock of 5,250 sheep. G. I. Pozniak

- 1171**—OLTEANU, G., 1959. [Lung nematodes of sheep and goats in Rumania.] **Wiadości Parazytologiczne**, **5** (4/5), 367–377. [In Russian: English & Polish summaries p. 377.]

Olteanu reports that the lungworms found in sheep and goats in Rumania are *Dictyocaulus*

*filaria*, *Protostrongylus kochi*, *P. hobmaieri*, *Protostrongylus* sp., *Muellerius capillaris* and *Cystocaulus nigrescens*. The incidence of infection reaches 100% with heavy mortality. Dictyocauliasis is prevalent in lambs and kids, lambs gradually acquiring muelleriasis, protostrongyliasis and cystocauliasis later. Single infections were prevalent among lambs and kids, whereas multiple infections prevailed among adults. The incidence of dictyocauliasis was found to be inversely proportional to age, whereas that of protostrongyliasis was directly proportional. Maximum incidence of dictyocauliasis amongst lambs was in October while amongst the previous year's lambs and adult sheep it was at the end of the winter and the beginning of spring. *Dictyocaulus filaria* larvae did not survive the winter except for those on low pastures well covered with snow. At least 50% of those larvae survived in tap water at a depth of 11 cm. to 50 cm. for no less than 67 days. The author also describes an apparatus which is claimed to be more efficient than that of Baermann [but the differences are not apparent]. Also mentioned are the treatment and prophylaxis successfully carried out in 1957-58. Ditrazin, dissolved in water, at a dose of 0.1 gm. per kg. body-weight injected subcutaneously and repeated after 24 hours was more effective against dictyocauliasis in sheep than some other anthelmintics.

N. Jones

- 1172—PARNELL, I. W. & DUNN, A. M., 1960. [Animal Health and Nutrition Laboratory, Perth, Western Australia.] "Notes on some anthelmintic dosing trials on Scottish Blackface hogs wintered on in-bye fields." *British Veterinary Journal*, **116** (1), 9-30.

Trials on hogs wintered in the open on hill farms in Scotland have shown that body and fleece weights can be increased during the winter by suitable drenching against *Ostertagia* spp. and *Trichostrongylus* spp. The drenching was given once or twice during the autumn, once in early winter and once in late winter or early spring. In three trials with aqueous suspensions of phenothiazine, given a few times in doses of 24 to 48 gm., a significant body-weight gain of 4.3 lb. was observed but fleece gain was only 5.4 oz. The gains were 4.8 lb. body-weight and 8 oz. fleece, both statistically highly significant, in a further four trials with three drenchings. The effect of four drenchings with 10 to 15 ml. of a 1:4 mixture of carbon tetrachloride in paraffin was low. Four drenchings with 25 to 32 ml. of "CN" (2% copper sulphate and 2% nicotine sulphate) resulted in an average weight loss of 0.7 lb. and a fleece gain of 3.6 oz.; while "NC" (commercial product of 1% nicotine sulphate and 1.6% copper sulphate) in doses of 31 to 46 ml. gave significant increases in body-weights of 5.1 lb. and fleece weights of 5.9 oz. Trials with the anthelmintics given alternately were too few to be conclusive. It is concluded that if phenothiazine and NC were used regularly the practice would be economically sound.

G. I. Pozniak

- 1173—RAMÍREZ M., A., 1957. "Algunos aspectos sobre distomatosis." *Agronomía. Lima*, **24** (90), 101-104.

Ramírez discusses some aspects of the prophylaxis and therapy of *Fasciola hepatica* infection in sheep.

N. Jones

- 1174—ROE, R., SOUTHCOTT, W. H. & TURNER, H. N., 1959. [Division of Plant Industry, C.S.I.R.O., Regional Pastoral Laboratory, Armidale, N.S.W.] "Grazing management of native pastures in the New England region of New South Wales. I. Pasture and sheep production with special reference to systems of grazing and internal parasites." *Australian Journal of Agricultural Research*, **10** (4), 530-554.

In a four-year grazing experiment with Merino sheep on native pasture in the New England region of New South Wales, three rates of stocking and continuous versus rotational grazing were compared. The rates of stocking were one sheep per 0.75, 1.0 and 1.25 acres. Rotational grazing was at one sheep per acre, weekly through four pastures. In the first three years of the trial a new group of one-year-old sheep was used. In the fourth year the sheep were carried on from the third year and were three years old when the trials concluded. Within each group a sub-group was drenched regularly with phenothiazine to control helminthiasis. No consistently significant differences in parasitic infections were recorded between grazing treatments. Live-weight gains of the treated sheep were significantly greater from the beginning of each experimental year in the late spring (November) to late winter (August) at all stocking rates. In the spring, when the quality of the pasture improved and worm egg counts were low, drenching



had no effect on live-weight gains in three of the four years. Drenched sheep showed greater skeletal growth and produced more wool than untreated controls in three of the four years. The additional amount of wool produced varied from 0.19 to 0.7 lb. per head. Deaths attributed to helminthiasis varied from 0.3% to 5.6% of the 600 sheep in the trial each year. Drenching with phenothiazine was very effective in reducing the numbers of *Haemonchus contortus* and *Oesophagostomum columbianum* but had less effect on *Trichostrongylus* spp. and *Ostertagia* spp. H. McL. Gordon

1175—ROSE, J. H., 1960. [Ministry of Agriculture, Fisheries and Food, Central Veterinary Laboratory, Weybridge, Surrey, U.K.] "*Nematodirus helvetianus* in British sheep." [Correspondence.] *Veterinary Record*, 72 (11), 215–216.

Rose records the recovery of *Nematodirus helvetianus* from the small intestine of a lamb which had been sent from a farm on the Isle of Wight for post-mortem examination. He states that of the estimated total of 108,000 worms present in the abomasum and small intestine, approximately 2,500 were *N. helvetianus*. C. Hatch

1176—SHCHERBATYUK, V. I. & KABAEV, D. K., 1959. [Paris green—an effective anthelmintic against cestodes in small ruminants.] [Abstract.] *Veterinariya*, 36 (6), 41. [In Russian.]

A single treatment with Paris green of 130,000 sheep and goats in 1957 reduced losses from cestode diseases by 40% as compared with 1956. The dosage used was 0.1 gm. to 0.3 gm. for two to five-year-olds, according to age, and 0.6 gm. and 0.7 gm. (0.1 gm. less in the spring) for ewes and rams. This anthelmintic is more effective than the previously popular copper sulphate solution. G. I. Pozniak

1177—SHCHERBININ, I. V., 1959. [Kafedra Parazitologii, Odesski selskhozyaistvennii institut.] [A rare case of ascariasis in a sheep.] *Zoologicheski Zhurnal*, 38 (12), 1888. [In Russian: English summary p. 1888.]

*Ascaris ovis* was found in the intestine (18 worms) and the liver (23 worms) of a sheep which died in the Beltsy area. Ascariasis of sheep is rare in the U.S.S.R. G. I. Pozniak

1178—SCHMIDT-HOENSDORF, F., 1959. [Institut für Parasitologie d. Vet. Fak., Freie Universität, Berlin-Dahlem.] "Ecobol, ein subcutan verabreichbares Leberegelmittel." *Wiadomości Parazytologiczne*, 5 (4/5), 335–339. [Polish summary p. 339.]

Sheep infected with *Fasciola hepatica* and *Dicrocoelium dendriticum* were treated with Ecobol (manufactured by Riedel de Haen, Berlin) which contains 500 mg. of carbon tetrachloride in one ml. of an oil in water emulsion. A dose of 200 mg. per kg. body-weight (about 20 ml. per animal) was injected subcutaneously at the side of the thoracic wall. On autopsy at various periods, single *F. hepatica* were found in only two of the 121 sheep treated. *D. dendriticum* remained unaffected. No harmful effects were observed although the animals included newly imported and pregnant sheep. The treatment should not be applied at times of illness, shearing and fodder change. G. I. Pozniak

1179—STEPANOV, I. A., 1959. [Comparative evaluation of the efficacy of tin arsenite and 1% solutions of copper sulphate against *Moniezia* infection in sheep.] [Abstract.] *Veterinariya*, 36 (6), 41–42. [In Russian.]

Monieziasis in four to five-month-old lambs was treated in one group of 150 with 0.3 to 0.7 gm. of tin arsenite per animal and in a second group of 150 with 30 to 45 ml. of 1% copper sulphate solution. Dosing was preceded by a 12 to 14-hour hunger diet. The first treatment was made 29 days after the animals had been put on pasture and was twice repeated 25 and 50 days later. On control examination seven days after the first treatment, the first group was free of eggs; in the second group eggs were present in nine lambs after the first treatment, in three after the second and in none after the third. The infection of control lambs was 80% to 85%. G. I. Pozniak

1180—THOMAS, R. J., 1959. [School of Agriculture, Kings College, Newcastle-on-Tyne, U.K.] "Field studies on the seasonal incidence of *Nematodirus battus* and *N. filicollis* in sheep." **Parasitology**, **49** (3/4), 387–410.

Thomas studied the seasonal fluctuation in the output of *Nematodirus* eggs by regular examination of faeces from sheep of different ages. He relates this to the number of *Nematodirus battus* and *N. filicollis* recovered from sheep slaughtered during his three years' work and gives details of counts of larvae on pasture during the period. In lambs high egg counts were recorded during April, May and June but the number of eggs declined rapidly and few were recorded after September. In hogs and ewes the egg output was low throughout the year although there was some increase in the period April–June. Post-mortem examinations showed that worm burdens in hogs were low throughout the year except during March and April. In lambs heavy infections occurred during May. Larvae were recovered in large numbers from pastures during April, May and June but few occurred at other times of the year. Thomas states that only one generation of worms was produced each year and that the life-cycle required a prolonged resting stage on the pasture. He discusses this in relation to outbreaks of disease and their control.

H. D. Crofton

1181—TRACH, V. N., 1958. [Institut Zoologii, Akademiya Nauk Ukrainskoi SSR.] [Helminths of sheep in the Crimean highlands.] **Dokladi Akademii Nauk Ukrainski SSR.**, Year 1958, No. 8, pp. 900–902. [In Ukrainian: English & Russian summaries p. 902.]

Thirty species of helminths are listed from 38 sheep carcasses examined in the Crimean highlands. *Dicrocoelium*, *Nematodirus* and lungworms are particularly harmful in the area. The sheep were more intensely infected with *Trichostrongylus vitrinus*, *Trichuris ovis* and *D. dendriticum* and less so with species of *Haemonchus* and *Ostertagia* than those of the Polesie area of the Ukraine. *Marshallagia marshalli* and *N. oiratianus* are typical "southern species" and had not been found in Polesie.

G. I. Pozniak

### Pigs (Swine)

See also Nos.: 1208, 1362, 1510, 1547, 1562.

1182—ISOBE, C. ET AL., 1959. [Department of Public Health, Kumamoto Prefecture, Kumamoto, Japan.] [Studies on *Gnathostoma doloresi* Tubangui, 1925 in south area of Kyushu.] **Journal of the Kumamoto Medical Society**, **33** (8), 1551–1555. [In Japanese.]

A wild boar, in addition to pigs, was found to be a final host of *Gnathostoma doloresi*, in southern Kyushu. In an attempt to determine the second intermediate hosts in the area *Oncorhynchus miltschitsch macrostomus*, *Rana rugosa*, *R. nigromaculata*, *R. temporaria ornativentris*, *Rhacophorus schlegelli arborea*, *Potamon dehaani*, *Pipistrellus abramus* and mink were investigated, but with negative results.

Y. Yamao

1183—KELLEY, G. W., OLSEN, L. S., SUMPTION, L. & ADAMS, J., 1960. [Department of Animal Pathology, University of Nebraska, Lincoln, Nebraska, U.S.A.] "Effectiveness of hygromycin B as an ascicide for growing-finishing swine." **Veterinary Medicine**, **55** (2), 73–75. Kelley *et al.* report that hygromycin B fed to four-month-old pigs at the rate of 6,000 units per pound of feed effectively reduced the number of pigs infected and lowered the intensity of infection with *Ascaris suum*. The treatment was found to have no effect on the extent of liver damage and did not increase the rate of weight gain. However, it did not depress the appetite of heavier pigs.

N. A. Hancock

1184—KRESAN, A., 1959. [Trichuriasis in pigs and its control.] [Abstract.] **Veterinariya**, **36** (6), 43. [In Russian.]

Trichuriasis in 320 young pigs was successfully treated with sodium silicofluoride. Those weighing 25 to 30 kg. received 0.5 gm. and those weighing under 20 kg. received 0.3 gm. per animal three times daily for two days. Osarsol had proved ineffective.

G. I. Pozniak



**1185**—MUTOVIN, V. I. & NOSKOV, A. I., 1959. [Biomycin (aureomycin) in the treatment of ascariasis in pigs.] [Abstract.] **Veterinariya**, **36** (6), 42–43. [In Russian.]  
Biomycin in doses of 25 mg. per kg. body-weight was tested against ascariasis in 22 piglets aged four months. Examinations before and two weeks after the treatment indicated 100% efficacy and no ascarids were found on autopsy of two of the animals. G. I. Pozniak

**1186**—NIKITISHIN, P. K., 1959. [Group treatment of pigs with sodium fluoride.] [Abstract.] **Veterinariya**, **36** (6), 43. [In Russian.]  
A preliminary experiment was undertaken to test sodium fluoride and sodium silicofluoride against ascariasis in 400 pigs. The anthelmintics were given in the food three times daily for two days. The doses for both were 0.5 gm. for pigs weighing 40 kg. and 0.8 to 0.9 gm. for those weighing 80 kg. The efficacy of the fluoride was 98–99% and of the silicofluoride 91–93%. In the following three years (1956–58) over ten thousand pigs on a farm were treated with the more efficient sodium fluoride. No side effects were observed except in one group which received water immediately after dosing. G. I. Pozniak

**1187**—RUKAVINA, J. & GALL, Z., 1959. [Institute for Parasitology of the Veterinary Faculty, University of Sarajevo.] “Nekoliko podataka o trihinelozu svinja za period 1932–1938 god.” **Veterinaria. Sarajevo**, **8** (2), 269–270. [English summary p. 269.]  
Rukavina & Gall report that out of 2,568,962 pigs, slaughtered at export and large city abattoirs of Yugoslavia, from 1932 until 1938 inclusive, only 57 were found to be infected with trichineliasis. N. Jones

**1188** THIENPONT, D., DE KEYSER, J., VANDERVELDEN, M. & KAGERUKA, P., 1959. [Ecole des Assistants Vétérinaires, Astrida, Ruanda-Urundi.] “La cysticerose cérébrale du porc.” **Annales de la Société Belge de Médecine Tropicale**, **39** (4), 507–514. [English, German, Spanish & Flemish summaries pp. 512–514.]  
Thienpont *et al.* in the course of examination of 100 pigs with muscular cysticerciasis in Ruanda-Urundi, found that 68 of them harboured larvae of *Taenia solium* in the brain. Only vesicular forms were found and never *Cysticercus racemosus*. These larvae were localized in all parts of the brain or meninges in numbers ranging from 1 to 86. The authors further describe the histological and clinical aspects of this disease and conclude by commenting on the difficulty of clinical diagnosis in pigs. N. Jones

**1189**—VICKERS, C. L., 1960. [Columbia, South Carolina, U.S.A.] “Diseases of baby pigs. Part II.” **Veterinary Medicine**, **55** (2), 43–50, 84, 88.  
Amongst other diseases of pigs, Vickers discusses *Strongyloides ransomi*, the intestinal threadworm. He enumerates the predisposing causes, age incidence, symptoms and diagnosis of infection and mentions the great necessity of prevention owing to the lack of successful treatment. N. A. Hancock

## Elephants

See No.: 1347.

## Camels and Llamas

*No relevant abstracts in this issue*

## Rabbits and Hares

See also Nos.: 1375, 1421, 1458, 1507, 1522, 1538, 1539, 1543, 1547, 1551, 1554.

\***1190**—CH'EN, T. H., 1957. [Further observations on behaviour of *Schistosoma japonicum* in the anterior ocular chamber of rabbit.] **National Medical Journal of China**, **43** (10), 777–781. [In Chinese.]

## Cats and Dogs

See also Nos.: 1390, 1416, 1528, 1534, 1554, 1559, 1561.

- 1191—CHAKRABARTY, M. & SINHA, P. K., 1960. [Department of Pathology and Preventive Veterinary Medicine, Bengal Veterinary College, Calcutta.] "On the occurrence of *Opisthorchis tenuicollis* (Rudolphi, 1819) Stiles and Hassall, 1896 (syn. *O. viverrini* (Poirier, 1886) Stiles and Hassall, 1896) in domestic cat in India." **Indian Veterinary Journal**, 37 (1), 17-18.

Chakrabarty & Sinha report on a new record of *Opisthorchis tenuicollis* from the bile-duct and intestine of a domestic cat in India. A description of the morphology is given, with one figure. Diagnostic points differentiating *O. tenuicollis* from *O. felineus* are given: a longer oesophagus, closer juxtaposition of testes and ovary, testes more deeply lobed and vitellaria in groups of follicles rather than a continuous row.

N. A. Hancock

- 1192—EDESON, J. F. B., 1959. [Institute for Medical Research, Kuala Lumpur, Federation of Malaya.] "Studies on filariasis in Malaya: the periodicity of the microfilaria of *Brugia malayi* and *B. pahangi* in animals." **Annals of Tropical Medicine and Parasitology**, 53 (4), 381-387.

*Brugia malayi* microfilariae were semi [nocturnally] periodic in naturally infected cats and nocturnally periodic in naturally infected *Macaca irus*. *B. pahangi* microfilariae were semi [nocturnally] periodic in naturally and experimentally infected cats, *Nycticebus coucang* and a dog.

W. A. F. Webber

- 1193—EDESON, J. F. B. & LAING, A. B. G., 1959. [Institute for Medical Research, Kuala Lumpur, Federation of Malaya.] "Studies on filariasis in Malaya: the effect of diethylcarbamazine on *Brugia malayi* and *B. pahangi* in domestic cats." **Annals of Tropical Medicine and Parasitology**, 53 (4), 394-399.

Eleven cats which had been infected experimentally with *Brugia* were given various dosages of diethylcarbamazine. The numbers of microfilariae were reduced, but microfilariae persisted for six to ten months after treatment in three of the cats. Most of the adult worms found at post-mortem examination were dead and calcified.

W. A. F. Webber

- 1194—EGERTON, J. R. & ROTHWELL, T. L. W., 1959. [Department of Agriculture, Stock and Fisheries, Port Moresby, Territory of Papua and New Guinea.] "The occurrence of *Spirocerca lupi* in dogs in New Guinea." **Australian Veterinary Journal**, 35 (9), 425-426.

*Spirocerca lupi* was diagnosed in New Guinea for the first time. It was found in two out of 50 dogs autopsied.

R. F. Riek

- 1195—GÜRALP, N., 1957. "Köpek ve kedi askaritlerinin tedavisinde piperazine adipate 'la yaptığımız deneyler ve aldığımız sonuçlar." **Veteriner Fakültesi Dergisi. Ankara Üniversitesi**, 4 (1/2), 42-51. [English summary pp. 50-51.]

Güralp administered to dogs one dose of 50 mg., two doses of 50 mg. and a single dose of 100 mg. of piperazine adipate and to cats a tablet of 250 mg. per lb. body-weight. As compared with controls, only one dose of 50 mg. failed to eliminate ascarids. No effects were observed against dog tapeworms.

T. Öden

- 1196—KUOKAWA, K., 1959. "Surgical treatment of canine filariasis." **Japanese Journal of Veterinary Science**, 21 (4), 231-240. [Japanese summary pp. 238-239.]

The author explains his surgical technique for removal of the worms from the right heart or the pulmonary artery.

Y. Yamao

- 1197—MCQUEEN, R. D., 1957. [*Dirofilaria immitis* as cause of congestive heart failure in a dog.] **Bulletin de la Société Vétérinaire Hellenique**. Ser. B, No. 26, pp. 69-72. [In Greek: English & French summaries p. 72.]

McQueen reports the first case from Greece of congestive heart failure in a dog caused by *Dirofilaria immitis* infection. The dog in question had been brought to the country four years previously from the U.S.A.

J. M. Watson



- 1198**—MIMIOĞLU, M., GÜRALP, N. & SAYIN, F., 1958. "Ankara'da iki köpekte tesbit ettiğimiz *Echinococcus granulosus* (Batsch 1786), Rudolphi 1805 vak'ası." **Türk Veteriner Hekimleri Derneği Dergisi**, **28** (146/147), 36-47. [English summary p. 45.]  
31 dogs were examined for parasites in Ankara during 1957 and 1958. Adult *Echinococcus granulosus* were found in two dogs; one of two dogs harboured two *Uncinaria stenocephala* and one *Taenia hydatigena* and the other 17 *Dipylidium caninum*.  
T. Öden
- 1199**—MIMIOĞLU, M. & SAYIN, F., 1957. "Ankara köpeklerinde tesbit edilen ilk *Heterophyes heterophyes* (v. Siebold, 1852) Stiles ve Hassall, 1900 vak'ası." **Veteriner Fakültesi Dergisi, Ankara Üniversitesi**, **4** (1/2), 1-5. [German summary p. 5.]  
Mimioglu & Sayin found *Heterophyes heterophyes* in dogs in Ankara. They suggest that this is the first record in Turkey.  
T. Öden
- 1200**—PATNAIK, B., 1959. [Orissa, Cuttack, India.] "The trematode parasites of dogs in Orissa." **Indian Veterinary Journal**, **36** (12), 595-600.  
15 stray dogs examined by autopsy showed the following: 11 with *Opisthorchis felineus*, nine with *Echinocasmus perfoliatus*, three with *Paragonimus westermani* and one with *Schistosoma suis*. The pathology of affected organs is discussed.  
N. A. Hancock
- 1201**—THOMAS, R. E., 1960. [University of Tennessee Atomic Energy Commission Agricultura Research Laboratory, Oak Ridge, Tennessee, U.S.A.] "Incidence of intestinal parasites in German Shepherd dogs." **Journal of the American Veterinary Medical Association**, **136** (1), 25-26.  
Thomas reports on a helminth survey of 1,027 German Shepherd dogs on arrival for army service from most areas in America. 67% were free of helminth infection, 21% had hookworms, 10% whipworms, 4% roundworms and 3% tapeworms. 52 dogs had two species of parasite and two had three species, hookworm and whipworm being the commonest multiple infection, with hookworm and roundworm next. [Genera and species of helminths are not given.]  
N. A. Hancock
- 1202**—VAUGHN, J. & JORDAN, R., 1960. [Department of Tropical Medicine & Public Health, Tulane University School of Medicine, New Orleans, Louisiana, U.S.A.] "Intestinal nematodes in well-cared-for dogs." **American Journal of Tropical Medicine and Hygiene**, **9** (1), 29-31.  
170 fresh dog stools were collected from the roadside, in an area of New Orleans where dogs may be expected to be well cared for, and examined for helminth ova. A further 325 samples were obtained from dogs brought in for treatment. The results were: 6-8% *Toxocara canis*, 16-19% *Trichuris vulpis*, 46-52% *Ancylostoma caninum*. These results were compared with figures from an autopsy survey of over 1,000 dogs abandoned in New Orleans, and no marked difference [except for *T. vulpis*] was found. Vaughn & Jordan conclude that regular anthelmintic treatment is unlikely to have much effect. The distribution of ova and probable infection of children are discussed.  
N. A. Hancock

### Fur-bearing Animals

- 1203**—SADIKHOV, I. A., 1958. [Role of fur-bearing animals in Azerbaidzhan as vectors of helminths in animals and man.] **Izvestiya Akademii Nauk Azerbaidzhanskoi SSR. Seriya Biologicheskikh i Selskokhozyaistvennikh Nauk**, Year 1958, No. 5, pp. 49-54. [In Russian.]  
Of a total of 62 species of helminths recorded for fur-bearing animals in Azerbaidzhan, 16 are also parasitic in man, 18 in dogs, 14 in cats, six in domestic ruminants, 10 in pigs, five in horses and one in domestic birds. This indicates the importance of fur-bearing animals as vectors of these infections.  
G. I. Pozniak

### Laboratory Animals

See also Nos.: 1477, 1481, 1483, 1499, 1511, 1515, 1522, 1526, 1538, 1543, 1548, 1551, 1553, 1557, 1565, 1571.

- 1204—CHALUPSKÝ, J., 1957. [Parazitologický ústav fakulty Karlovy university, Praha, Czechoslovakia.] "Trichinelosa u potkanů a krys." *Československá Epidemiologie, Mikrobiologie, Imunologie*, **6** (4), 281–284. [English and Russian summaries p. 283.]  
Chalupský examined 209 *Rattus norvegicus* and 21 *R. rattus* for trichinelliasis. 181 of the animals came from Prague and its neighbourhood and the others from different parts of the country. 90% of them were examined by the compression method and 10% by artificial digestion. The results were negative. N. Jones
- 1205—HERLICH, H., 1959. [Regional Animal Disease Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Auburn, Alabama, U.S.A.] "Anthelmintic trials against *Paraspidodera uncinata* the cecal worm of the guinea pig, with observations on the length of the nematodes." *Journal of Parasitology*, **45** (6), 586.  
Phenothiazine at 440 mg. per kg. body-weight, piperazine hexahydrate at 150 mg. per kg. and Ronnel (Dow ET-57) at 200 mg. per kg. were ineffective against *Paraspidodera uncinata* infections in guinea-pigs. An average of 14.2 worms were recovered from 15 experimental animals. The worms corresponded with previous descriptions of the parasite except that the length was greater. In this study the range of the female worm was from 23.6 to 27.5 mm. and the male from 17.5 to 21.6 mm. compared with the previous maximum length of 19 mm. for the female and 17.4 mm. for the male. K. Heath
- 1206—KERSHAW, W. E., LEYTHAM, G. W. H. & DICKERSON, G., 1959. [Department of Parasitology & Entomology, Liverpool School of Tropical Medicine, Liverpool, U.K.] "The effect of schistosomiasis on animal intelligence." *Annals of Tropical Medicine and Parasitology*, **53** (4), 504–506.  
Kershaw *et al.* found that low-grade infection with schistosomiasis produces in white rats a retardation of ability to learn, as measured by the numbers of errors made in solving a T-maze. The effect is indirect, autopsy having revealed no parasites in the brain, and is proportional to the intensity of infection. Infection does not interfere with the recollection of what has been already learnt. Although not directly applicable to human infections, such results do show that schistosomiasis can and does cause demonstrable changes in behaviour. J. M. Watson
- 1207—LEFROU, G. & MICHARD, V., 1957. [Institut Pasteur de Kindia, Guinée Française.] "Étude sur les causes de mortalité des chimpanzés en captivité à l'Institut Pasteur de Kindia (1950–1956)." *Annales de l'Institut Pasteur. Paris*, **93** (4), 502–516. [English summary p. 516.]  
Strongyle larvae were found in one and an unidentified helminth in another, both in the bronchioles, at autopsy of 56 chimpanzees which died from pulmonary complaints. *Strongyloides* infection was confirmed by faecal examination. An unidentified nematode was also found in the intestine of one of a number of chimpanzees that died from intestinal causes N. Jones
- 1208—ROBINSON, H. A., 1959. [Colorado State University.] "Role of rats and mice in the transmission of the porkworm, *Trichinella spiralis* (Owen, 1835) Railliet, 1895." *Dissertation Abstracts*, **20** (5), 1912.
- 1209—TROFIMOV, V. P. & ALYABEVA, L. L., 1959. [Fascioliasis of guinea-pigs.] [Abstract.] *Veterinariya*, **36** (6), 43–44. [In Russian.]  
Over half of the guinea-pigs at an experimental laboratory were lost due to an outbreak of fascioliasis following their feeding on grass mown from an area frequented by infected cattle and sheep. The accompanying clinical symptoms and pathological changes are described. G. I. Pozniak

## Poultry

See also Nos.: 1383, 1475, 1476, 1477, 1574.

- 1210—AKTAN, F. & ÇELİK, H., 1957. [Veteriner Akademisi iç hastalıklar kliniği Şef.] "Kümes hayvanları nematodlarının toplu tedavisinde piperazin." *Veteriner Fakültesi Dergisi. Ankara Üniversitesi*, **4** (1/2), 29–41. [German summary pp. 39–40.]  
Aktan & Çelik found 10% piperazine hexahydrate to be non-toxic to fowls and effective against *Ascaridia galli*, *Heterakis gallinae* and *Capillaria*. T. Öden



- 1211**—BORGES FERREIRA, L. D., 1957. [Laboratório de Patologia Veterinária de Évora, Alto Alentejo, Portugal.] "Infestação pelo *Heterakis gallinae* (Gmelin, 1790) no *Anser anser domesticus*." *Revista de Ciências Veterinárias*. Lisbon, 52 (360), 21–25. [English & French summaries p. 25.]

A goose kept with chickens died from *Heterakis gallinae* infection, whereas the chickens themselves showed only slight emaciation and a few parasite eggs in the faeces. N. Jones

- 1212**—EDGAR, S. A., 1958. [Poultry Husbandry Department, Alabama Polytechnic Institute, Auburn, Alabama.] "The effects of worms on broilers and laying hens." [Abstract.] *Proceedings, Association of Southern Agricultural Workers*, 55th Annual Convention (1958), p. 210.

Edgar reports that a survey in the south-western U.S.A. showed that various species of tapeworms as well as *Ascaridia* and *Heterakis gallinae* were of economic importance in poultry breeding. Flukes were rarely found as the poultry consists mainly of turkeys and chickens. N. Jones

- 1213**—EDGAR, S. A. & FRAZIER, J. A., 1957. [Experimental Station, Alabama Polytechnic Institute, Auburn, Ala, U.S.A.] "Piperazine compounds for the elimination of nematodes from chickens and turkeys." [Abstract.] *Proceedings of the Association of Southern Agricultural Workers*, 54th Annual Convention (1957), pp. 249–250.

Results of 14 experiments involving 328 chickens and 281 turkeys showed that: (i) piperazine hexahydrate, piperazine chloride and piperazine adipate were highly effective in the treatment of *Ascaridia galli* and *A. dissimilis* infections, but less effective in eliminating *Heterakis gallinae* and *Capillaria obsignata*, and without effect against *C. annulata*; (ii) the drugs were less effective against immature worms and more effective in the case of young birds; (iii) piperazine adipate in the feed had half the efficacy of the other drugs in drinking water; (iv) preliminary water starvation increased the efficacy of piperazine, and the addition of magnesium sulphate increased it only slightly. N. Jones

- 1214**—GÜRALP, N., 1957. "Tavukların askarit ve *Heterakis*'lerine karşı piperazine citrate'in antelmantik tesirine dair müşahedelerimiz." *Veteriner Fakültesi Dergisi*. Ankara Üniversitesi, 4 (1/2), 15–28. [English summary pp. 26–27.]

Güralp used piperazine citrate against *Ascaridia galli* and *Heterakis gallinae* in chickens, and found that it was not effective against the latter. T. Öden

- 1215**—IVANOVA, Z. I. & KHITENKOVA, L. P., 1957. [Piperazine adipate as an anthelmintic and its efficacy in treating ascariasis in domestic fowl.] *Trudi. Gosudarstvenni Nauchno-Kontrolni Institut Veterinarnikh Preparatov*, 7, 328–338. [In Russian.]

Piperazine adipate, when applied by oral intubation as a 3–5% solution in doses of 0.25 to 0.4 gm. per kg. body-weight to a large number of domestic fowls with ascariasis, gave efficacies reaching 100%. Even doses ten times the therapeutic dose were not toxic and the treatment dispenses with special diets and laxatives. G. I. Pozniak

- 1216**—LÜHRS, E., 1957. "Die Wirkung von Wurmkuren auf die Legeleistung der Hühner." *Praktische Tierarzt (Der)*, Year 1957, No. 11, pp. 317–321.

Lührs points out that farmers are unwilling to apply ascaricides to laying hens with sub-clinical infections, if such treatment is connected with a subsequent financial loss due to depressed egg-laying. He has shown experimentally that two ascaricides, denoted "X" and "Y", which are also effective against tapeworms and hairworms, depressed egg-laying in Leghorns and New Hampshires to two-thirds of the pre-treatment value in the month after dosing. On the other hand, piperazine citrate in doses of 10 gm. to five litres of water, added once or on two consecutive days, was effective against roundworms and did not influence egg-laying. G. I. Pozniak

- 1217**—RAO, S. B. V., 1960. [Indian Veterinary Research Institute, Izatnagar, U.P., India.] "Don't let your chickens play host to worms." *Indian Farming*, 9 (10), 32–34, 36.

This is a popular article emphasizing the importance of controlling *Ascaridia galli* and tapeworm infections in chickens and explaining how this can be done. J. M. Watson

**1218**—SAVCHENKO, M. E., 1959. [Seasonal dynamics of *Heterakis* infections in domestic fowls in Krivorozh.] [Abstract.] *Veterinariya*, **36** (6), 43. [In Russian.]  
A monthly examination for *Heterakis* of ten hens and ten chicks showed that in adult birds the lowest infection occurred in January to March and the highest in July to August, then it fell again by December. In young birds, heterakids were first found in June and the highest infection occurred in August to September, falling again by November. G. I. Pozniak

**1219**—SIEGMANN, O., 1959. [Celle, Dörnbergstr. 25/27, West Germany.] "Wirkung und Anwendung von Hygromycin B bei der Bekämpfung von Geflügelhelminthen." *Berliner und Mühener Tierärztliche Wochenschrift*, **72** (23), 467-469. [English summary p. 469.]  
Siegmann shows that the antibiotic Hygromycin B (in the form of Hygromix) can be given to growing chickens in the food at a percentage of 0.5, equal to 25,000 units per kg. food, without adverse effect on growth and development, 12,500 to 15,000 units being enough to control heterakids and ascarids in poultry. A flock of 400 laying hens were given 0.5% Hygromix for eight weeks and from the 14th day until four to six weeks after treatment ceased all birds were free from heterakids and ascarids. Re-infection was thought to be due to infective stages of larvae in the litter. Hygromycin B is likely to be of great value to poultry keepers but it should always be administered under the control of a veterinary surgeon. A. E. Fountain

**1220**—VOROBEV, M. M., 1959. [Experimental treatment of *Cyathostoma* infections in geese.] [Abstract.] *Veterinariya*, **36** (6), 43. [In Russian.]  
*Cyathostoma* infection was cured in 52 out of 53 geese by tracheal intubation of 10 ml. of iodine solution (1 ml. of 10% tincture of iodine in 1,000 ml. water). One goose died on the fifth day. G. I. Pozniak

### Other Mammals

See Nos.: 1192, 1221, 1226, 1331, 1338, 1340, 1344, 1348, 1354, 1363, 1366, 1371, 1432, 1433, 1434, 1435, 1437, 1438, 1439, 1440, 1441, 1442, 1456, 1457, 1469, 1483, 1521.

### Other Birds

See also Nos.: 1250, 1323, 1335, 1336, 1339, 1341, 1342, 1343, 1344, 1345, 1353, 1367, 1379, 1445, 1446, 1475, 1518, 1523.

**1221**—KARLOVIĆ, M., RICHTER, S. & ALERAJ, Z., 1960. "Streptokaroza japanskih gusaka (*Sygnopsis sygnoides* L.)." *Veterinarski Arhiv*, **30** (1/2), 7-12. [English & French summaries pp. 11-12.]  
Karlovic *et al.* describe *Streptocara pectinifera* infection from Japanese geese (*Sygnopsis sygnoides*) in the area of Vilika Gorica (Yugoslavia), at the source and on the upper course of the River Odra. Adult parasites were recovered from the walls of the oesophagus and gizzard and, in one case, from the mucous membrane of the larynx and pharynx. The infection, which also occurred in ducks, affected only those Japanese geese that spent some time on the river. Infected geese died after approximately one month of illness, during which characteristic nodules were observed on the neck alongside the oesophagus. The authors first observed the infection in 1957 and claim that this is the first report of *S. pectinifera* infection in Japanese geese. N. Jones

**1222**—LUCAS, A. & LAROCHE, M., 1957. [Laboratoire Central de Recherches Vétérinaires d'Alfort. Section d'Etudes et de Recherches sur la Pathologie du Gibier.] "Le tétrachlorure de carbone dans la thérapeutique anthelmintique aviaire. I. Son action dans la syngamose." *Recueil de Médecine Vétérinaire*, **133** (6), 329-334.  
One to three doses of 0.125 c.c. to 0.25 c.c. of carbon tetrachloride cured *Syngamus trachea* infection in all four pheasants treated within 14 days. The drug was equally effective whether given pure in a capsule or applied with a syringe as one part in four with vaseline oil. 1.0 c.c.



per kg. body-weight was toxic to a partridge. A dose of 0.125 c.c. of the oil solution for a 200 gm. bird is recommended. Tetrachlorethylene was ineffective against this infection.

N. Jones

- 1223**—LUCAS, A. & LAROCHE, M., 1957. [Laboratoire Central de Recherches Vétérinaires d'Alfort. Section d'Études et de Recherches sur la Pathologie du Gibier.] "Le tétrachlorure de carbone dans la thérapeutique anthelminthique aviaire. II. Son action dans la capillarirose." *Recueil de Médecine Vétérinaire*, **133** (9), 569–575.

Lucas & Laroche treated eight pheasants against capillariasis of the crop and intestine with three to five doses of 0.125 c.c. to 0.5 c.c. of carbon tetrachloride, either pure or as one part in four with oil. From the results, the authors recommend three successive daily doses of 0.5 c.c. to 1.0 c.c. of the oil solution and repetition of this treatment after two weeks. N. Jones

- 1224**—LUCAS, A. & LAROCHE, M., 1957. [Laboratoire Central de Recherches Vétérinaires d'Alfort. Section d'Études et de Recherches sur la Pathologie du Gibier.] "Le tétrachlorure de carbone dans la thérapeutique anthelminthique aviaire. III. Son action dans la trichostrongylose caecale épizootique." *Recueil de Médecine Vétérinaire*, **133** (10), 659–662.

Three treatments at one to two weekly intervals and consisting of three successive daily doses of 0.125 c.c. of one part in four of carbon tetrachloride with oil failed to cure completely a partridge of *Trichostrongylus tenuis* infection. The therapy resulted, however, in the disappearance of clinical symptoms and in an important reduction of the number of eggs per gramme of faeces. N. Jones

### Reptiles and Amphibia

See Nos.: 1325, 1330, 1350, 1384, 1430, 1431, 1460, 1461, 1481.

### Miscellaneous

See also Nos.: 1203, 1385, 1432, 1434, 1435, 1441, 1555, 1560, 1567.

- 1225**—BABENSKAS, M. [Pracownia Parazytologii Instytutu Litewskiej Akademii Nauk, Wilno, Poland.] "Zwalczanie motylicy w Litewskiej Republice Radzieckiej." *Wiadomości Parazytologiczne*, **5** (4/5), 341–344. [English summary p. 344.]

Babenskas reports that the average incidence of *Fasciola hepatica* infection in cattle and sheep, as derived from observations carried out on 71 farms in Lithuania, was 46% to 91% in 1951–52. At the same time 0.4% to 32% of *Galba truncatula* on 20 farms were found infected with larval flukes. It was possible to reduce the incidence of infection among cows to nil with two therapeutic doses of hexachlorethane, given at intervals of three weeks. The results were greatly improved by combining anthelmintic treatment with early allergic diagnosis of the disease and pasture rotation. Using these methods the incidence of infected *Galba truncatula* was reduced to nil and within two years the incidence of fascioliasis in the Republic was 19 times lower among cattle and 76 times lower among sheep. Also, the milk yield per cow was greatly increased and mortality greatly reduced. N. Jones

- 1226**—BOCH, J., 1957. [Zoolog.-Parasitologisches Institut, München 22, Veterinärstr. 13.] "Bekämpfung des Magendarmwurmbefalls des Wildes." *Monatshefte für Tierheilkunde*, **9**, 230–235.

Boch was able to confirm the favourable results he had obtained in 1955–56 with Helmucidan against intestinal and lungworms of wild deer [for abstract see Helm. Abs., **25**, No. 61c] when he applied it widely the following winter in over 22 forest districts with both roe and red deer. Results were disappointing only at feeding points at which the attendance of the deer was irregular. The possibility of using Helmucidan against worm infections in chamois is being investigated. G. I. Pozniak

- 1227**—DISSANAIKE, A. S. & JAYASURIYA, D. J. C., 1959. [Department of Parasitology, Faculty of Medicine, Colombo, Ceylon.] "Some parasites hitherto unreported from pigs and cattle in Ceylon." *Ceylon Veterinary Journal*, **7** (3/4), 30-33.
- Dissanaike & Jayasuriya found in pigs at the municipal abattoir in Colombo in 1957-58, *Ascaris lumbricoides* var. *suis*, *Ascarops dentata* and *Physicocephalus sexalatus*, the last two invariably occurring together. *Schistosoma spindale* and *Onchocerca armillata* were found in cattle. This is said to be the first report of these helminths from these hosts in Ceylon. N. Jones
- 1228**—GEMMELL, M. A., 1959. "Hydatid disease in Australia. IV. Observations on the incidence of *Echinococcus granulosus* on stations and farms in endemic regions of New South Wales." *Australian Veterinary Journal*, **35** (9), 396-402.
- Gemmell records data on the incidence in Australia of the adult and larval stages of *Echinococcus granulosus* in dogs and sheep respectively. The incidence and degree of infection in dogs were correlated with age and it is suggested that repeated exposure may influence the degree of infection but not the incidence. M. A. Gemmell
- 1229**—GEMMELL, M. A., 1959. [Hydatid Research Unit, Medical Research Council of New Zealand, University of Otago Medical School, Dunedin, C.I., New Zealand.] "Hydatid disease in Australia. VI. Observations on the Carnivora of New South Wales as definitive hosts of *Echinococcus granulosus* (Batsch, 1786), (Rudolphi, 1801), and their role in the spread of hydatidiasis in domestic animals." *Australian Veterinary Journal*, **35** (10), 450-455.
- Gemmell records data on the incidence of *Echinococcus granulosus* in the dingo and fox in Australia. Of 41 foxes examined, one was found to harbour a single non-gravid segment of *E. granulosus*. Ten of 21 dingoes were affected. Experimental infection of fox and domestic cat with *E. granulosus* revealed two adults on the 112th day in the fox and one on the 84th day in the cat. In none of these animals were gravid worms found. From the survey and experimental work it is concluded that neither the fox nor the cat is a true host of *E. granulosus* in Australia. The dingo, by virtue of its restricted distribution in New South Wales, was considered of importance as a carrier in certain regions only. M. A. Gemmell
- 1230**—GEMMELL, M. A., 1959. "Hydatid disease in Australia. VII. An appraisal of the present position and some problems of control." *Australian Veterinary Journal*, **35** (12), 505-514.
- Gemmell reviews survey work carried out in Australia on hydatid infection in man and domestic and wild animals from 1922. Problems of control in relation to sociological and economic factors are discussed. M. A. Gemmell
- 1231**—GROVES, T. W., 1957. [Imperial Chemical Industries, Ltd., Pharmaceuticals Division, Veterinary Services Department, Fulshaw Hall, Wilmslow, Cheshire, U.K.] "Developments in the field of parasitic bronchitis." *Outlook on Agriculture*, London, **1** (6), 252-258.
- A review is given of the lungworms most pathogenic to domestic animals, namely *Dictyocaulus filaria*, *D. viviparus*, *Protostrongylus rufescens* and three species of *Metastrongylus*. The pathology of the infections in cattle and sheep is shown by the effects on the lungs where cellular reactions and solidification of the affected areas is seen, together with such clinical signs as coughing, dyspnoea, anorexia and dehydration. In pigs the disease is most serious in young animals where considerable respiratory trouble is found. A natural immunity can be established where young stock has grazed on lightly infected pasture. It is now possible to control outbreaks of these infections by chemotherapeutic treatment with cyanacethydrazide, which has a specific action against lungworms. The oral administration of irradiated larvae and the use of whole worm antigen vaccine have also produced good results. K. Heath
- 1232**—HANSON, R. P., 1960. [University of Wisconsin.] "Epizootiology, the basis for rational disease control programs." *Journal of the American Veterinary Medical Association*, **136** (3), 97-103.
- Hanson urges, with many examples, the importance of co-operation between the veterinary practitioner and the research worker in the field of epizootiology. Reference is made, *inter alia*, to bovine cysticerciasis and to *Fascioloides magna* infection of sheep and deer. J. M. Watson



- 1233**—HUMBLE, A. E., 1958. "Hydatids—a disease of animals and humans." *Journal of the Department of Agriculture, South Australia*, **62** (2), 100–103.  
[This is a popular article.]
- 1234**—LOKHMANENKO, V. A., 1959. [Otdel epidemiologii i borbi s gelmintozami, Institut malyarii, meditsinskoi parazitologii i gelmintologii, Ministerstvo zdravookhraneniya SSSR.] [Possibility of spreading trichinellosis by incorrect organization of burying dead animals.] *Gigiena i Sanitariya, Moscow*, **24** (5), 77–79. [In Russian.]  
Lokhmanenko shows that some of the largest animal cemeteries in the Mogilev area are a source of *Trichinella* infection to wild and domestic animals. Such cemeteries do not conform to veterinary and sanitary requirements, and are accessible to such animals as wolves, foxes, dogs, domestic rodents and predacious birds. The principal sources of infection are the carcasses of dogs and pigs. The author concludes with recommendations for appropriate improvement measures.  
G. I. Pozniak
- 1235**—MARTIN, C. A., 1960. [Department of Agriculture, Tapanui, New Zealand.] "Prevent hydatids. Proper offal and carcass disposal." *New Zealand Journal of Agriculture*, **100** (2), 173, 175.
- 1236**—MERDIVENCI, A., 1958. "Yurdumuzun bazi böğelerinde evcil siğir (*Bos taurus*) larimizda *Fasciola gigantica* (Cobbold, 1855) nin mevcudiyeti." *Türk Veteriner Hekimleri Derneği Dergisi*, **28** (142/143), 12–23. [English summary p. 20.]  
*Fasciola gigantica* was found in four regions of Turkey in cattle and sheep. The literature is reviewed and the life-history discussed. Morphological characters, a distribution map and figures are given.  
T. Öden
- 1237**—MERDIVENCI, A., 1958. "Evcil koyun (*Ovis aries*), keçi (*Capra hircus*) ve siğir (*Bos taurus*) larimizda *Thysaniezia giardi* (Moniez, 1879) nin mevcudiyeti." *Türk Veteriner Hekimleri Derneği Dergisi*, **28** (146/147), 52–60. [English summary p. 58.]  
The occurrence of *Thysaniezia giardi* (Moniez) is reported for the first time in domestic sheep, goats and cattle in Turkey. Figures and a review of the literature and morphological characters are given.  
T. Öden
- 1238**—MERLE, A., 1958. "Les cysticercozes communes à l'homme et aux animaux." *Bulletin de l'Office International des Epizooties*, **49** (7/8), 483–500.  
Merle briefly reviews the occurrence of cysticerciasis in man, ox and pig and diphyllbothriasis in man and fish. The world-wide incidence of porcine and ovine cysticerciasis is presented in tabular form and discussed. Of the countries where records are available, porcine cysticerciasis is most serious in Madagascar (10%) and the Cameroons (9%). Bovine cysticerciasis is most serious in Kenya, Ethiopia and the Belgian Congo (15–80%); the incidence, although low, is slowly increasing in Britain, Germany, Italy, the Low Countries, Switzerland and Hungary. *Diphyllbothrium* infection is most frequently encountered in areas around the Baltic and North Seas, the Danube delta, and the Swiss and Italian lakes. Taeniasis and cysticerciasis in man are briefly discussed.  
G. M. Urquhart
- 1239**—SADIKHOV, I. A., 1959. [Anoplocephalid infections of adult ruminants in the Lenkoran area of Azerbaidzhan.] *Izvestiya Akademii Nauk Azerbaidzhanskoi SSR. Seriya Biologicheskikh i Selskokhozyaistvennikh Nauk*, Year 1959, No. 4, pp. 77–81. [In Russian.]  
The anoplocephalid species found in 218 cattle, 97 buffaloes, 19 zebu cattle and 37 sheep in Azerbaidzhan were *Moniezia expansa*, *M. benedeni* and *Thysaniezia giardi* (in sheep only). *M. expansa* in buffaloes and *M. benedeni* in zebu are reported for the first time for this region. *M. expansa* infected 3.33–5.69% and *M. benedeni* 1.77–2.22% of cattle and, respectively, 16.2% and 2.7% of sheep. Animals aged over four years were not affected.  
G. I. Pozniak
- 1240**—SEIDEL, G. K., 1957. [Department of Parasitology of the Faculty of Veterinary Science, Bogor State University of Indonesia.] "*Strongyloides ransomi* Schwartz and Alicata 1930, a parasite, also occurring in pigs in Indonesia. Preliminary communication." *Communicationes Veterinariae, Bogor*, **1** (2), 71–79. [French, German & Indonesian summaries pp. 77–78.]  
Seidel found *Strongyloides ransomi* together with some ascarids, *Trichuris* and oesophagostomes

at autopsy of three pigs which were brought from a pig-breeding farm. The lack of morphological and dimensional differences between *S. ransomi* and *Strongyloides* spp. from horse and sheep is stressed. 1,000 to 5,000 filariform larvae from the pigs were applied to the abdominal skin of three young dogs, eight guinea-pigs, four young rabbits and four five-month-old sheep. Observation in most cases was made for 45 days. Three rabbits and five guinea-pigs were successfully infected but no infection occurred in sheep or dogs despite repetition of the attempt. From cultures of *S. ransomi* in a mixture of pig and horse faeces it was found that pre-sexual and pre-filariform larvae could already be morphologically differentiated only a few hours after hatching. The genital primordium grew faster in the pre-sexual form than in the pre-filariform larvae. Both forms of larvae moulted twice. Filariform larvae remained alive for no longer than 15 to 18 days. Mature males and females were obtained, males living for five and females for eight to nine days. A succeeding free-living generation was not observed. Great variations in the proportion in the number of males and females was observed. N. Jones

**1241**—SPEDDING, C. R. W., 1957. [Grassland Research Institute, Hurley, Berks, U.K.] "Grazing management and the control of parasites." *Agricultural Review*, London, 2 (9), 24-27.

Spedding discusses the management of grazing in connection with control of nematode infections in general in sheep and lungworm infection in particular in cattle. He concludes that in the case of sheep emphasis must be placed on rapidity of movement over the cleanest pasture available, whereas in cattle emphasis must be on the provision of uncontaminated pasture with a rapid rotation, especially for young stock. J. M. Watson

**1242**—TAYLOR, E. L., 1960. [Veterinary Laboratory, Ministry of Agriculture, Fisheries & Food, Weybridge, Surrey, U.K.] "Livestock disease in modern farming." *Span*, London, 3 (1), 2-5.

This interesting article is the major part of a paper entitled "The Relationship between Intensive Agriculture and Animal Disease" which the author read at the annual congress of the British Veterinary Association last September. Taylor deals with live-stock disease in relation to modern research under the principal headings of Conventional Animals, Conventional Foods and Conventional Microbial Background, which can only be maintained by constant attention. He then goes on to discuss the eradication of pathogens and the principles underlying the relationship between host, parasite and environment and changes therein. The principal conclusion is that progressive agriculture produces a disease environment by upsetting natural adjustments, and continually advancing production can only proceed through constant re-adjustment of the uncertain new relationships. Parasitic worms and their control feature among the wide range of examples cited. J. M. Watson

**1243**—VASILKOV, G. V., 1959. "Helminthology in the service of stock-breeding." *Indian Veterinary Journal*, 36 (12), 611-614.

Vasilkov gives a brief survey of helminthology as applied to domestic animals in Russia. N. A. Hancock

## FISHERIES HELMINTHOLOGY

### Fresh-Water Fisheries

See also Nos.: 1337, 1345, 1452, 1454, 1464, 1477, 1508.

**1244**—CHAUHAN, B. S. & RAMAKRISHNA, G., 1959. [Zoological Survey of India, Calcutta.] "On the occurrence of fish mortality due to helminthic infestation by cestode cysts in a stocking tank at Nagpur (India)." *Indian Journal of Helminthology*, Year 1958, 10 (1), 53-55.

Chauhan & Ramakrishna report that a heavy mortality of fingerlings of *Labeo rohita*, *Cirrhana mrigala* and *Catla catla* was caused by the presence of minute cysts measuring 0.14 × 0.31 mm. to 0.2 × 0.3 mm. in various regions of the alimentary canal. Each cyst consisted of an inverted scolex bearing developing suckers and five pairs of hooks, each hook measuring 0.08 to



0.12 mm. in length. The presence of the unidentified cestode larvae was accompanied by a swelling of the infected organ and of the whole abdomen. *L. rohita* often contained several thousand cysts and was the most heavily infected of the three host species. I. L. Owen

**1245**—HOLLOWAY, H. L., 1957. [Roanoke College, Virginia.] "The distribution of *Neoechinorhynchus cylindratu*s Van Cleave in North America." [Abstract of paper presented at 35th Annual Meeting of the Virginia Academy of Science, May 8-11, 1957.] *Virginia Journal of Science*, 8 (4), 296-297.

A study of Westhampton Lake fishes showed that *Neoechinorhynchus cylindratu*s finds optimal physiological conditions in a relatively small number of fishes when compared with the large number of fish (28 species) reported as definitive hosts. The parasite has been reported from nine States in America (eight east of the Mississippi and Minnesota) and Ontario Province in Canada. N. A. Hancock

**1246**—HUGGHINS, E. J., 1959. [South Dakota Agricultural Experiment Station, Brookings, South Dakota, U.S.A.] "Parasites of fishes in South Dakota." *Bulletin. South Dakota Agricultural Experiment Station*, No. 484, 73 pp.

Brief notes are given on 35 species of parasites which include Digenea, Cestoda, Nematoda, Acanthocephala, Hirudinea and Crustacea. None is new. Tables are included which give the location and the frequency of infection of 28 species of fishes as well as the sites of infection and general morphological features to aid in the identification of parasites. I. L. Owen

**1247**—IZYUMOVA, N. A., 1959. [Institut Biologii Vodokhranilishch, Akademia Nauk SSSR.] [Parasitic diseases of fish dangerous to man in the area of barrage reservoirs.] *Wiadomości Parazytologiczne*, 5 (4/5), 445-451. [In Russian: English & Polish summaries pp. 449-451.]

Izyumova briefly compares infections with *Diphyllbothrium latum* and *Opisthorchis felineus* in fish in three reservoirs along the Volga, which have been dammed off for different lengths of time. Exploitation for fish farming encourages human settlements along the coast and this, coupled with an expected increase in infection over that in the river, presents conditions particularly favourable for the spread of these infections. G. I. Pozniak

**1248**—JAIN, S. L., 1959. [Indian Statistical Institute, Calcutta-35, India.] "Some observations on the monogenetic trematodes from the gill filaments of some Indian freshwater fishes." [Correspondence.] *Current Science*, 28 (8), 332-333.

Jain records some observations on the feeding, locomotion and survival in artificial media of the dactylogyrids *Haploleidus gontius*, *Thaparocleidus wallagonius*, *Mizelleus indicus* and *Sprostonia wallagonia*, from the fishes *Wallagonia attu* and *Mystus vittatus* (Bloch). The pharynx is protruded and used as a suction pump in drawing out blood from the thin walls of the capillaries. Many of the flukes were still alive four to five hours after death of the host but only survived 10 to 18 minutes after removal from the host, irrespective of whether it had been dead four to five hours or five minutes. M. M. Sarwar

**1249**—MIKAILOV, T. K., 1959. [The parasite fauna of Acipenseridae of the River Kura.] *Izvestiya Akademii Nauk Azerbaidzhanskoi SSR. Seriya Biologicheskikh i Selskokhozyaistvennikh Nauk*, Year 1959, No. 2, pp. 79-83. [In Russian.]

Nine helminth species were found during 1953-55 by examination of eight *Huso-huso caspicus* and 40 specimens of three species of *Acipenser* from the estuary of the river Kura. They were *Nitzschia sturionis*, *Skryabinopsolus acipenseris*, *Amphilina foliaceae*, *Bothrimonus sturionis*, *Eubothrium acipenserinum*, *Corynosoma strumosum*, *Leptorhynchoides plagicephalus*, *Cucullanus sphaerocephalus* and *Eustrongylides* sp. G. I. Pozniak

**1250**—MIKAILOV, T. K., 1957. [Some data on the distribution of ligulids in Azerbaidzhan waters.] *Izvestiya Akademii Nauk Azerbaidzhanskoi SSR.*, No. 9, pp. 95-101. [In Russian.]

*Ligula intestinalis* and *Digamma interrupta* are widely distributed in Azerbaidzhan. In 1955, infection was observed in the river Kura in bleak and bream (mass infection), in *Varicorhinus capoeta sevangi*—about 50% infected in the nearby Mingechaursk reservoir—and in one

*Abramis sapa*, and in Lake Nour (Kutkashen area) in 60–70% of chub. In the recently formed Mingechaursk reservoir, oncospheres were present in *Diaptomus sarsi*. Five species of birds are listed as the final hosts in this region. G. I. Pozniak

1251—TRAVASSOS, H., 1959. "Nótula sôbre o pacamão *Lophiosilurus alexandri* Steindachner, 1876." *Atas da Sociedade de Biologia do Rio de Janeiro*, 3 (4), 1–2.

Nematodes and trematodes were found in the intestine, stomach and gall-bladder of about 12% of *Lophiosilurus alexandri* examined during a survey of fish from waterways in the basin of the São Francisco river, Brazil. M. McKenzie

### Marine Fisheries

See also No. 1333.

1252—CHING, H. L., 1959. [University of Nebraska.] "Studies on some digenetic trematodes of Puget Sound, Washington." *Dissertation Abstracts*, 20 (5), 1905.

### Miscellaneous

See also Nos.: 1495, 1496.

1253—GRABDA, E. & GRABDA, J., 1959. [Zakład Chorób Ryb, W.S.R., Olsztyn, Poland.] "Zagadnienia parazytologiczne w rybactwie polskim." *Wiadomości Parazytologiczne*, 5 (4/5), 459–462. [English summary p. 462. Discussion pp. 463–465.]

Recent work on the parasites of fish in Poland included an investigation of the influence of ecological factors on the composition of the parasite fauna, the biology and pathology of worms, and the study of parasites in the Vistula and in many lakes. The parasite fauna of the Baltic and some water reservoirs, and various aspects of pathology, prophylaxis and treatment await investigation. G. I. Pozniak

## NEMATOTOLOGY

### Free-Living Nematoda

See also Nos.: 1356, 1365, 1372, 1490, 1506.

1254—LUBYANOV, I. P., 1959. [Nauchno-issledovatel'skiy Institut gidrobiologii, Dnepropetrovskiy gosudarstvenniy universitet.] [The benthal fauna of the lowland water reservoirs of the central Dnieper region to be flooded by the waters of the Dneprodzerzhinsk reservoir.] *Zoologicheskiy Zhurnal*, 38 (11), 1612–1619. [In Russian: English summary p. 1619.]

Lubyonov has studied the benthal fauna of water reservoirs which are situated along the river Dnieper and are soon to be inundated by waters from the Dneprodzerzhinsk reservoir. The biocoenoses were of the pelophilous and phytophilous type. The fauna included various molluscs, crustaceans and leeches, and the following nematodes are listed among the most numerous species occurring: *Enoploides fluviatilis*, *Trilobus pellucidus*, *Dorylaimus stagnalis*, *Alaimus* and *Ironus ignarus*. G. I. Pozniak

1255—S'JACOB, J., BERKUM, J. A. VAN & GUEVARA, D., 1959. [Sección de Nematología de la Landbouwhogeschool, Wageningen, Holland.] "*Tylenchorhynchus parvus* Allen, 1955 (Nematoda: Heteroderidae), hallada por primera vez en Europa en muestras de suelo de Granada (España)." *Revista Ibérica de Parasitología*, 19 (4), 427–428. [English summary p. 428.]

*Tylenchorhynchus parvus* is recorded for the first time from soil in Europe. 19 other species of nematodes were also found in samples of soil from three sites in Spain. J. B. Goodey

1256—WIESER, W., 1959. [Zoologisches Institut der Universität Wien.] "Reports of the Lund University Chile Expedition 1948–49. 34. Free-living marine nematodes. IV. General part." *Lunds Universitets Arsskrift*, N.F. avd. 2, 55 (5), 111 pp.

Wieser made an ecological study of the free-living marine nematodes of Chilean coastal waters, classifying them in a manner very similar to that used by him previously in the case of European



marine nematodes [for abstract see Helm. Abs., 22, No. 80a]. He also divides them into the same four morphological groups, according to the type of mouth cavity and supposed feeding habits: (1A) without a distinct mouth cavity, feeding solely by sucking in small soft particles of deposited material, 28 spp.; (1B) with an unarmed mouth cavity, feeding by suction assisted by mouth and lip movements, thus able to take in somewhat larger and harder particulate organisms, 69 spp.; (2A) with a lightly armed mouth cavity, feeding by scraping the surface of larger bodies, or piercing and sucking them, 80 spp.; (2B) mouth cavity with powerful teeth or other armature, mainly predacious, 74 spp. In addition, one species of the Enchelidiidae is listed as having a 1A-type male and a 2B-type female, a sexual dimorphism which Wieser had noted previously amongst other Enchelidiidae. Of the four main habitats in the littoral zone, exposed sand harboured nematodes mainly of the 2B group, whereas the nematode fauna of sheltered sand, with more deposited material, was almost exclusively of the 1B type. Exposed and sheltered algae, on the other hand, had predominantly nematodes of the 2A group although different types of algae showed interesting differences in nematode fauna. Of the three main sublittoral habitats, the soft bottom contained nematodes predominantly of the 2A type, whereas the coarse bottom and secondary substrates had the 1B, 2A and 2B groups almost equally represented. Data are given to show that nematodes with long head setae are typical of coarse sand, those with short or vestigial setae abounding in the soft bottom. The nematodes are also classified in other ways, e.g. into stenotopic as opposed to eurytopic species, and data on vertical distribution on the beach are given. A final table lists the 252 species found. The paper concludes with a list of almost 500 papers on free-living marine nematodes, believed by the author to be a complete bibliography up to November, 1957.

R. D. Winslow

[All new species in Appendix 6 have been previously described by Wieser (see Helm. Abs., 22, No. 587a; 23, No. 843a; 25, No. 461a). An exception is *Viscosia macramphs* n.sp. which appears to be a *nomen nudum*, unless it is a new name for *V. microseta* Wieser, 1953, which does not appear in Appendix 6. *Oxystomina* replaces *Oxystomatina* but no reasons are given for this. *Chromadoropsis* is preoccupied so the new combination *Atrochromadora dissoluta* n.g., n.comb. is made. It is unfortunate that the author cites so many species as new when he has previously described them in earlier papers. J.B.G.]

### Plant-Parasitic Nematoda

See also Nos.: 1349, 1351, 1352, 1361, 1364, 1374, 1380, 1381, 1422, 1444, 1486, 1489, 1498, 1501, 1509, 1512, 1516, 1530, 1533.

**1257**—ANON., 1959. "Potato—a root-knot nematode (*Meloidogyne arenaria*)."  
**Canadian Insect Pest Review**, 37 (7), 242.

The occurrence of an infestation of *Meloidogyne arenaria* on potato tubers and associated weeds is reported from Grand Forks, British Columbia. Tubers infested with *M. arenaria* do not show the typical nodules as they do when infested with *M. hapla*. D. J. Hooper

**1258**—ANON., 1959. "Import interceptions of interest."  
**Canadian Insect Pest Review**, 37 (7), 251.  
Soil with cacti from France contained named plant-parasitic nematodes. Several rose shipments from Holland had infestations of *Meloidogyne hapla* and some badly affected plants were destroyed. D. J. Hooper

**1259**—BAIN, D. C., 1958. [Department Plant Pathology, State College, Mississippi.] "Reaction of red and white clover introductions to root-knot nematodes." [Abstract.] **Proceedings. Association of Southern Agricultural Workers**, 55th Annual Convention (1958), p. 219.

[This abstract also appeared in **Phytopathology**, 1958, 48, 341. For abstract see Helm. Abs., 27, No. 142c.]

- 1260**—BIRD, A. F., 1959. [Commonwealth Scientific and Industrial Research Organization, Commonwealth Research Station, Merbein, Victoria, Australia.] "The attractiveness of roots to the plant parasitic nematodes *Meloidogyne javanica* and *M. hapla*." *Nematologica*, **4** (4), 322–335. [German summary p. 334.]

Bird describes experiments on the physiological mechanisms associated with the growth of roots which cause them to be attractive to the larvae of *Meloidogyne*. Root-knot larvae were not attracted to concentrated or unconcentrated tomato root exudates. Sugars did not attract the larvae and of several amino-acids tested, only glutamic acid elicited any response. It is suggested that under normal conditions acidic substances such as glutamic acid play a part in maintaining larval contact with the surface layer of the root. Further tests with numerous naturally occurring plant substances, pH, carbon dioxide and oxygen failed to show any marked attractant properties. The principal factor influencing the attraction of larvae of *Meloidogyne* to roots was redox potential. Bird suggests that the larvae move along a potential gradient caused by lower redox potentials. Contact with the root is then maintained by these lower potentials and also by the acidic nature of the surface protoplasm. Factors such as root secretions, soil moisture, temperature, and pH may all influence this primary effect and play important secondary roles. H. R. Wallace

- 1261**—COLE, C. S. & HOWARD, H. W., 1959. [Plant Breeding Institute, Cambridge, England.] "The effect of growing resistant potatoes on a potato root eelworm (*Heterodera rostochiensis* Woll.) population." *Nematologica*, **4** (4), 307–316. [German summary p. 316.]

The growing of resistant potatoes produces a greater decrease in the eelworm population than does fallowing. Many crops are needed, however, to reduce the population to a level where two crops of a susceptible variety would not raise it again to a dangerous level. The results are based on one soil type, on one set of climatic conditions and on cysts of one set of ages, and Cole & Howard suggest that bigger reductions may occur in other soil types. Data are presented which show that no increase in the frequency of "resistance-breaking" eelworms occurs after three years of growing resistant potatoes, and that an increase is apparent only after four years. However, this result is probably related to the initial frequency of "resistance-breaking" eelworms in the population. It is suggested that if resistant potatoes are not grown more frequently than one year in four there would be time between potato crops for a normal decrease in populations to occur and it would consequently take more than four crops of resistant potatoes to increase the frequency of "resistance-breaking" types of eelworm to a significant level. Furthermore, an alternation of standard susceptible varieties with resistant varieties might also delay the build-up of "resistance-breaking" types of eelworm, if "resistance-breaking" is recessive to "non-resistance-breaking" in the eelworm. H. R. Wallace

- 1262**—CORBETT, M. K., 1959. [Plant Pathology Department, University of Florida, U.S.A.] "Diseases of the coconut palm. III. Red ring." *Principes*, Gainesville, Fla., **3**, 83–86.

Corbett summarizes the published knowledge on red ring of coconut caused by *Aphelenchoides cocophilus*, which on the recommendation of Chitwood he refers to as *Chitinoaphelenchus cocophilus* (Cobb) Micoletzky. [This promotion of the subgenus *Chitinoaphelenchus* Micoletzky, 1922 to generic rank and the placing of *A. cocophilus* within it has overlooked the designation by Chitwood (1935) of *A. ormerodis* as type of *Chitinoaphelenchus* (for abstract see Helm. Abs., **4**, No. 55h).] J. B. Goodey

- 1263**—DALLIMORE, C. E., 1960. "Symptoms of *Ditylenchus destructor*, the potato rot nematode infection, and their development during storage." [Abstract of paper presented at the 1959 Annual Meeting of the Pacific Division, American Phytopathological Society, San Diego, California, June 17–19, 1959.] *Phytopathology*, **50** (1), 83.

Infection of *Ditylenchus destructor* on potatoes is primarily restricted to the tubers. The earliest external symptom is a discoloration beneath the periderm. When the lesions increase in size and coalesce the periderm has a papery appearance and eventually breaks to expose the diseased tissue beneath. Early internal symptoms are pearly white spots which develop into dark loose woolly lesions. In advanced stages potato tissue has a brown matted wool appearance and confirmation of the presence of *D. destructor* is necessary. Further development of symptoms during storage may or may not occur. D. J. Hooper



- 1264**—DICKERSON, O. J. & SLACK, D. A., 1958. [Agricultural Experiment Station, University of Arkansas, Fayetteville, Arkansas.] "Parasitic nematodes associated with strawberries in Arkansas." [Abstract.] **Proceedings. Association of Southern Agricultural Workers**, 55th Annual Convention (1958), p. 221.

[This abstract also appeared **Phytopathology**, 1958, **48**, 342. For abstract see Helm. Abs., **27**, No. 142e.]

- 1265**—DONAUBAUER, E., 1959. "Über Schäden durch Nematoden in österreichischen Forstpflanzgärten." **Anzeiger für Schädlingskunde**, **32** (5), 68–69.

The author reports briefly on the condition of spruce seedlings in various Austrian forest nurseries. Growth was poor, with short needles which were often reddish brown and with roots showing necrotic lesions. Nematodes [unspecified] were found associated with these roots. After treating certain seedlings attacked by the fungus *Fusoma parasiticum* with a copper preparation the author concluded that nematodes play a primary role in the sickness of spruce seedlings.

J. B. Goodey

- 1266**—DREES, H. & WIRTZ, W., 1958. [Zoologisches Institut, Universität Köln.] "Über die Entwicklung von *Heterodera rostochiensis* Wollenweber und ihre Abhängigkeit von Umweltfaktoren." **Pflanzenschutzberichte**, **20** (11/12), 161–178. [English summary p. 176.]

The authors studied the development of the potato-root eelworm in relation to environmental factors and found that under uniform conditions considerable variation in cyst size occurs, the small cysts being oblong, the larger ones spheroidal. The largest number of cysts was produced when soil humidity was around 72%. Dry conditions induced a high proportion of small cysts. The size of cysts was proportional to their egg and larval content. The sex ratio was influenced by environmental factors and the ratio of females to males was 4:1 following June infections, 1:1 from April infections and 2:1 from August infections.

C. C. Doncaster

- 1267**—DROLSON, P. N., MOORE, E. L. & CLAYTON, E. E., 1957. [North Carolina Agricultural Experiment Station, Tobacco Research Station, Oxford, N.C., U.S.A.] "Resistance to two *Meloidogyne* species in breeding lines of flue-cured tobacco." [Abstract.] **Proceedings of the Association of Southern Agricultural Workers**, 54th Annual Convention (1957), pp. 219–220.

[This abstract also appears in **Phytopathology**, **47**, 312. For abstract see Helm. Abs., **26**, No. 131d.]

- 1268**—DUGGAN, J. J., 1959. [Agricultural Zoology Department, University College, Dublin, Eire.] "On the number of generations of beet eelworm, *Heterodera schachtii* Schmidt, produced in a year." **Nematologica**, **4** (4), 241–244. [German summary p. 244.]

Duggan shows that three generations of *Heterodera schachtii* may be produced within a year on mangolds under the climatic conditions found in Ireland. By using cysts from each successive generation as the inoculum for mangold seedlings planted in test tubes plunged in peat out of doors, beginning in April, the first generation was obtained in June, the second in September and the third in January. Only a few third generation females were produced, however.

A. M. Shepherd

- 1269**—FIGUEIREDO, M. B., 1958. [Escola Superior de Agricultura "Luiz de Queiroz" Universidade de S. Paulo, Piracicaba, Brazil.] "Algumas observações sobre os nematódeos que atacam o fumo no Est. de São Paulo." **Revista de Agricultura. São Paulo**, **33** (2), 69–73.

Tobacco in the State of São Paulo, Brazil, is lightly attacked by *Meloidogyne javanica* and heavily by *M. inornata*. The latter is a new host record. A description is given of *M. inornata*; it is identified by the perineal pattern, which falls into the *incognita* group, and by the fact that the male head has a single post-labial annule. Attacked plants have galled roots with secondary rotting, general loss of vigour and premature yellowing of the leaves.

M. T. Franklin

- 1270**—GOFFART, H., 1957. [Münster/Westf. Biologische Bundesanstalt.] "Fortschritte auf dem Gebiete der Züchtung nematodenresistenter Kartoffelsorten." **Kartoffelbau**, **8** (10), 194–195.

Goffart discusses the present position in the breeding of potatoes resistant to *Heterodera rostochiensis*. In view of the increasing use of *Solanum andigenum* as a source of resistance, he

investigated the possibility of a quick test, based on the stimulatory level of the root diffusate. This level proved no guide to susceptibility, however, as diffusates from resistant and susceptible *andigenum* lines were good hatching agents, while those from certain other resistant species of *Solanum* failed to stimulate hatching. Resistance in *andigenum* is associated rather with inability of the nematodes to develop within the roots than with reduced hatching or invasion. A search for regional differences in nematode behaviour and virulence revealed that cysts from seven localities in Germany behaved similarly towards root diffusates, and that three out of ten resistant *andigenum* lines were apparently immune to 18 cyst populations, four others being highly resistant, and the remaining three more susceptible, although no nematode population was outstandingly virulent. Goffart emphasizes the valuable reduction in nematode numbers which may result from the growing of resistant potatoes capable of stimulating hatch.

R. D. Winslow

- 1271—GOFFART, H., 1959. [Biologische Bundesanstalt, Institut für Hackfruchtkrankheiten und Nematodenforschung Münster, Westf.] "Untersuchungen über einen Befall durch Stengelälchen (*Ditylenchus dipsaci*) an Futterrüben." *Anzeiger für Schädlingskunde*, 32 (2), 21–23.

Roots of fodder-beet attacked by *Ditylenchus dipsaci* lose both weight and feeding value and in storage attack continues. Partial nematode control is possible by chemical treatment in the field and leads to increased yield and better quality roots but light infections remain. As most fodder beet is consumed at home and not marketed the economic value of nematode control has to be considered against the production potential of the ground.

J. B. Goodey

- 1272—GOPLEN, B. P. & STANFORD, E. H., 1959. "Studies on the nature of resistance in alfalfa to two species of root-knot nematodes." *Agronomy Journal*, 51 (8), 486–488.

Goplen & Stanford tested the lucerne varieties Vernal selection M-4 and Caliverde with *Meloidogyne hapla* and *M. javanica*. During a period of five weeks no nematodes were found in the roots of Vernal M-4 inoculated with *M. hapla*, while Caliverde became infected and root proliferation and galling resulted. This is the first record known to the authors of the complete immunity of a plant to root-knot nematodes. No histological cause for immunity was observed. With *M. javanica* there was no galling or nematode reproduction in the resistant plants but nematodes entered the roots as they did those of susceptible plants. When reciprocal grafts were made of resistant and susceptible lucerne and the plants were subjected to attack by *M. hapla*, resistant roots with susceptible tops remained resistant and susceptible roots with resistant tops remained susceptible.

M. T. Franklin

- 1273—GOPLEN, B. P., STANFORD, E. H. & ALLEN, M. W., 1959. [Canada Department of Agriculture Research Laboratory, Saskatoon, Saskatchewan, Canada.] "Demonstration of physiological races within three root-knot nematode species attacking alfalfa." *Phytopathology*, 49 (10), 653–656.

Five varieties of lucerne were tested against a number of populations of three species of *Meloidogyne*, each population collected from lucerne in a different part of California. Of eight populations of *M. incognita acrita* two behaved differently from the rest: one reproduced on lucerne var. Africa, while the others failed to do so, and another failed to reproduce on M-8, a selection of Hilmar, while the others did so freely. No differences were found in the nine populations of *M. javanica* tested in the main experiment, but another experiment with a different population strongly suggested that this one would not have reproduced on M-8. The two populations of *M. hapla* reacted similarly towards the five varieties of lucerne in the main experiment, but on a different selection of Vernal they reacted differently from each other. The results of these experiments show the existence of different physiological races in the three species of *Meloidogyne* used, and emphasize the importance of using nematode inocula from several localities when breeding plants for resistance to these nematodes.

M. T. Franklin

- 1274—GOSS, O. M., 1958. "Root-knot eelworm of potatoes." *Journal of Agriculture of Western Australia*. 3rd series, 7 (6), 638–640.

Heavy infestations of root-knot nematodes cause swellings on potato tubers which may resemble common scab. Light infestations may easily escape notice. Mature females are embedded in



the tissue of the tuber surrounded by a translucent area. Transmission of the nematodes may be on implements, in drainage water, in infected seed tubers or seedlings. Prevention of spread, avoidance of host plants and fumigation with D-D or EDB are suggested as control measures.  
M. T. Franklin

**1275**—GRAHAM, T. W., 1958. [Pee Dee Experiment Station, Florence, S.C.] "Root knot and other nematodes in relation to the development of tobacco black shank." [Abstract.] **Proceedings, Association of Southern Agricultural Workers**, 55th Annual Convention (1958), pp. 219-220. [This abstract also appeared in **Phytopathology**, 1958, **48**, 343. For abstract see *Helm. Abs.*, **27**, No. 142g.]

**1276**—HAASE, W., 1957. [Pflanzenschutzagronom beim Rat des Kreises Kamenz, East Germany.] "Feste Mientenplätze zur Minderung der Kartoffelnematoden-Verschleppung." **Deutsche Landwirtschaft**, **8** (8), 399-400.

Haase examined seed potato clamps in various districts of East Germany and found that soil from them was frequently infested with potato-root eelworm. These clamps acted as a source of infection to local holdings to whom the seed was supplied. He suggests that permanent concrete seed potato stores should be built, similar to those found in West Germany which can more easily be sterilized.  
A. M. Shepherd

**1277**—HOYOS, F. G., 1959. [Bayerische Landesanstalt für Pflanzenbau- und Pflanzenschutz, Regensburg, West Germany.] "Beobachtungen über das Auftreten von Älchen an Erdbeerkulturen im Keilberger Erdbeeranbaugebiet." **Pflanzenschutz. Munich**, **11** (6), 85.

For many years strawberries have been grown intensively at Keilberg. Yields have now fallen seriously in spite of pest control measures and fertilization. The roots of the affected plants are dry and dead, the crown tissue brown, leaf stalks shortened, leaves small and crumpled with yellow patches. A search has shown large numbers of nematodes. From 10 gm. of chopped roots and crown tissue have been extracted 40 *Pratylenchus pratensis*, 415 *Ditylenchus dipsaci* and 20 males of *Meloidogyne*, probably *hapla*, besides many saprophagous forms. *D. dipsaci* is thought to be the cause of the trouble. It is recommended that the strawberry plants be removed and burnt, the land rested from strawberries for at least eight years and treated with D-D. Only clean stock should be used for replanting.  
M. T. Franklin

**1278**—JONES, F. G. W., 1957. "Breeding for resistance to potato root eelworm, *Heterodera rostochiensis* Woll." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 17 pp.

Jones reviews work done on the breeding of potatoes resistant to *Heterodera rostochiensis*. Resistance in *Solanum tuberosum* subsp. *andigena* is due to a single dominant gene but is only partial since the plant roots produce a hatching factor and are heavily invaded by larvae. When grown in infested soil *S. andigena*, and varieties bred from it, act as trap crops and cause a greater reduction than the normal annual loss when no crops or a non-host is grown. The occasional cysts formed on the roots of resistant plants are thought to be resistance-breaking biotypes. In tests of field populations the frequency of these biotypes ranged from less than 1% to 75%. If resistant plants are grown in the same soil for two years, the proportion of resistance-breakers increases.  
F. G. W. Jones

**1279**—KRADEL, J., 1958. [Biologische Zentralanstalt Kleinmachnow der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin.] "Nematodenschäden im Gartenbau." **Deutsche Gartenbau**, **5** (7), 187-190.

This article describes the damage caused by nematode parasites of garden plants, and briefly outlines the appropriate control measures. Kradel deals with leaf eelworms (*Aphelenchoides* sp.), stem and bulb eelworm (*Ditylenchus dipsaci*), potato tuber eelworm (*D. destructor*), root-knot eelworms (*Meloidogyne* spp.) and the cyst-forming eelworms (*Heterodera* spp.). He also briefly mentions the free-living genera *Paratylenchus* and *Pratylenchus*.  
M. T. Franklin

- 1280—LABRUYÈRE, R. E., OUDEN, H. DEN & SEINHORST, J. W., 1959. [Instituut voor Plantenziektenkundig Onderzoek, Wageningen, Netherlands.] "Experiments on the interaction of *Hoplolaimus uniformis* and *Fusarium oxysporum* f. *pisi* race 3 and its importance in 'early yellowing' of peas." *Nematologica*, 4 (4), 336-343. [German summary p. 343.]

Using the foam agar plate method of den Ouden for inoculation experiments, the authors conclude that neither *Fusarium oxysporum* f. *pisi* race 3 nor *Hoplolaimus uniformis* can cause serious root rot in peas when they operate separately, but that interaction of both organisms leads to extensive decay of the root cortex. Where "early yellowing" was found in the field, *H. uniformis* was always present, with the exception of one case on soil which was practically free from nematodes following D-D treatment. A. M. Shepherd

- 1281—LALL, B. S. & DAS, K. K., 1959. [Division of Entomology, Bihar Agricultural College, Sabour, (Bhagalpur).] "A preliminary note on the root knot nematodes (*Meloidogyne* sp.) affecting vegetable crops in Bihar." [Correspondence.] *Science and Culture, Calcutta*, 25 (1), 76-77.

Lall & Das found root-knot nematodes to be widely distributed and causing serious damage in Bihar on potato, tomato, brinjal (*Solanum melongena*), red pepper and bhindi (*Abelmoschus esculentus*). Heaviest infestations were of *Meloidogyne incognita* var. *acrita* on bhindi and brinjal, followed by *M. arenaria* on tomato, *M. javanica* on bhindi and potato and *M. incognita* on sponge gourd (*Luffa aegyptica*). Red pepper was also infested with *Aphelenchus avenae*. M. T. Franklin

- 1282—LALL, B. S. & DAS, K. K., 1959. [Division of Entomology, Bihar Agricultural College, Sabour (Bhagalpur), India.] "On the biology of root-knot nematode, *Meloidogyne incognita* var. *acrita* Chitwood. Nematoda: Heteroderidae." [Correspondence.] *Science and Culture, Calcutta*, 25 (4), 263-265.

Lall & Das studied the development of *Meloidogyne incognita* var. *acrita* in a number of different plants grown in pots of sterilized soil and each inoculated with a single egg mass. The life-cycle was longest (40.8 days) in January and shortest (28.8 days) in June. Development was quickest in brinjal and slowest in bhindi (*Abelmoschus esculenta*). All solanaceous plants included in the trial became infected. Soil samples taken from the field from March to May showed that the nematodes could survive for three months in the absence of hosts. In pot experiments D-D was found to give the best control, aldrin dust was next best and muriate of potash also gave a reduced infestation [no dosage rates are given]. M. T. Franklin

- 1283—LORDELLO, L. G. E. & MELLO, L. M. DE, 1958. [Escola Superior de Agricultura "Luiz de Queiroz", Universidade de S. Paulo, Piracicaba, Brazil.] "Breve notícia sobre a ocorrência de nematódeos atacando macieira no Estado de São Paulo." *Revista de Agricultura. São Paulo*, 33 (4), 223-224. [English summary p. 224.]

Lordello & Mello record for the first time an attack by *Pratylenchus* sp. on roots of apple trees in Brazil and suggest that meadow nematodes are probably responsible for many cases of poor growth and die-back reported from apple orchards in the State of São Paulo. A. M. Shepherd

- 1284—LORDELLO, L. G. E., ZAMITH, A. P. L. & ARRUDA, H. V. DE, 1958. [Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, Brazil.] "Nematódeos que prejudicam as culturas de soja e do algodoeiro no Estado de S. Paulo e sua interferência nos planos de rotação." *Revista de Agricultura. São Paulo*, 33 (3), 161-166. [English summary pp. 164-165.]

Poorly growing cotton plants had their roots severely attacked by *Pratylenchus steineri*; soya beans were also damaged by this eelworm and by root-knot nematodes. It is concluded that the rotation "soya bean-cotton" is inconvenient because the *Pratylenchus* population will increase on the soya beans and have severe effects on the following cotton crop. J. J. Hesling

- 1285—McGUIRE, J. M., WALTERS, H. J. & SLACK, D. A., 1958. [Agricultural Experiment Station, University of Arkansas, Fayetteville, Arkansas.] "The relationship of root-knot nematodes to the development of *Fusarium* wilt in alfalfa." [Abstract.] *Proceedings. Association of Southern Agricultural Workers*, 55th Annual Convention (1958), p. 219.

[This abstract also appeared in *Phytopathology*, 1958, 48, 344. For abstract see *Helm. Abs.*, 27, No. 142h.]



**1286**—MERA S., O. 1957. [Agrónomo del Instituto de Fomento Tabacalero.] "Algunas observaciones sobre nemátodos en el tabaco." **Agricultura Tropical. Bogotá**, 13 (5), 319-322.

In the tobacco-growing zone of the Department of Santander, Colombia, tobacco has been grown for many years and is now severely damaged by eelworms. Root galling is described, indicating that the nematodes are *Meloidogyne* sp., although the name is not mentioned. It is recommended that infected tobacco should be destroyed and other crops grown or the land rested for a couple of years.

M. T. Franklin

**1287**—MINTON, N. A., 1957. "Distribution of root-knot nematode in Alabama." [Abstract of paper presented at the 1957 Annual Meeting of the Alabama Academy of Science.] **Journal of the Alabama Academy of Science**, 29, 82-83.

Examinations were made of 262 soil and root samples from many different habitats throughout Alabama. In 58% of the samples *Meloidogyne* spp. were found; they were present in 81% of the samples from gardens and in 48% of those from other locations. *M. arenaria*, *M. hapla*, *M. javanica*, *M. incognita* and *M. incognita acrita* were found.

M. T. Franklin

**1288**—MINTON, N. A. & CAIRNS, E. J., 1957. [Alabama Polytechnic Institute, Auburn, Ala, U.S.A.] "Suitability of soybeans var. Ogden and twelve other plants as hosts of the spiral nematode, *Helicotylenchus nannus* Steiner, 1945." [Abstract.] **Proceedings of the Association of Southern Agricultural Workers**, 54th Annual Convention (1957), pp. 220-221.

[This abstract also appears in **Phytopathology**, 47, 313. For abstract see Helm. Abs., 26, No. 131f.]

**1289**—MOORE, A., 1960. [National Agricultural Advisory Service, Lincs (Holland), U.K.] "Tulip eelworm." **Agriculture. London**, 66 (10), 452-458.

Moore briefly reviews the early reports of *Diitylenchus dipsaci* attacking tulip bulbs and the way in which the disease spread in Britain. Symptoms of attack are described and illustrated and some alternative host plants are given. The spread of infections, methods of prevention and control are discussed. The standard hot-water treatment at 110°F. for two-and-a-half hours gives the best control of nematodes but can damage the bulbs, the effect varying according to how the bulbs are stored before treatment. The expectation of survival of many named tulip varieties when hot-water treated is given.

D. J. Hooper

**1290**—MORENO, A. F., 1959. [Instituto de Patología Vegetal, Instituto Nacional de Tecnología Agropecuaria, Buenos Aires, Argentina.] "Nematodos parásitos en cultivos de algodón." **Idia. Buenos Aires**, No. 133, pp. 29-32.

Moreno has investigated the nematodes in samples of cotton roots and the surrounding soil. *Meloidogyne incognita* and *M. incognita* var. *acrita* constituted 90% of the species found; *Pratylenchus pratensis* takes second place. He also found *Aphelenchoides solani* [*Aphelenchus avenae*], *Mononchus* sp. and *Nyngolaimus* sp.

M. T. Franklin

**1291**—MOUNTAIN, W. B., 1957. "Resistance as a function of tolerance levels." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 6 pp.

It was found that in certain areas of Canada varieties of tobacco which were apparently resistant to *Pratylenchus* were in fact tolerant, because although no stunting of the plant occurred, there were high populations of this eelworm in the roots. This tolerance was found to be relative and could be upset by increasing the number of nematodes within the roots or by substituting another species of *Pratylenchus*. On the basis of these facts, Mountain discusses his approach to the problem of how to indicate to the plant breeder the precise tolerance level of his material. A technique is described whereby the number of *Pratylenchus* of a certain species per gramme of root can be determined which will reduce the growth of the plant by some arbitrary amount. This figure has a standard deviation and gives a precise measure of the tolerance of the breeding material.

H. R. Wallace

**1292**—MOUNTAIN, W. B. & BOYCE, H. R., 1957. [Science Service Laboratory, Harrow, Ontario.] "Parasitic nematodes in relation to the peach replant problem in Ontario." [Abstract.] **Proceedings of the Association of Southern Agricultural Workers**, 54th Annual Convention (1957), p. 222.

[This abstract also appears in **Phytopathology**, 47, 313. For abstract see Helm. Abs., 26, No. 131g.]

- 1293—MYGIND, H., 1959. "Kartoffelålens forekomst i Danmark. Årsoversigter for jordprøveundersøgelser i 1955, 1956, 1957 og 1958." *Tidsskrift for Planteavl*, **63** (4), 696–705. [English summary p. 705.]

Examinations of soil samples for cysts of *Heterodera rostochiensis* have been carried out in Denmark since 1952. Infested soils were seldom found on the farms, but gardens in most parts of the country were severely infested and the number of infested gardens is increasing from year to year. The nurseries were free or almost free from potato-root nematodes.

S. Binge-fors

- 1294—NORMANHA, E. S., 1958. "Nematóides em melão." *Revista de Agricultura. São Paulo*, **33** (3), 157–159.

Normanha records root-knot on cantaloupe at two locations in São Paulo, describes the symptoms and claims to have controlled the nematodes successfully by soil treatment with Shell D-D prior to planting. The nematodes from one location were identified by Lordello as *Meloidogyne incognita*, and those from the other by Carvalho as the same species, possibly var. *acrita*.

R. D. Winslow

- 1295—NUSBAUM, C. J., 1958. [North Carolina State College, Raleigh, N.C.] "The response of root-knot infected tobacco plants to foliar applications of maleic hydrazide." [Abstract.] *Proceedings. Association of Southern Agricultural Workers*, 55th Annual Convention (1958): p. 220.

[This abstract also appeared in *Phytopathology*, 1958, **48**, 344. For abstract see Helm. Abs., **27**, No. 142i.]

- 1296—PARAMONOV, A. A., 1959. [Laboratoriya gelmintologii Akademii Nauk SSSR.] [Phytohelninthology, its tasks and prospects of development.] *Izvestiya Akademii Nauk SSSR. Seriya Biologicheskaya*, **24** (1), 3–15. [In Russian: English summary p. 15.]

Paramonov, after defining phytonematodes and giving their ecological classification [for abstract see Helm. Abs., **21**, No. 961bi], discusses the problems and tasks of phytohelminthology. Attention is also drawn to the method of collection of faunistic material and to the chemical control of phytohelminths. Connections between phytohelminthology and phytopathology are shown and the necessity of joint efforts by these two branches is stressed.

N. Jones

- 1297—PINEDA, F., 1957. "Nematodos parasitos de la caña de azúcar de Cuba." *Memoria. Asociación de Técnicos Azucareros de Cuba*. XXXI Conferencia Anual, pp. 9–14.

Nematodes associated with the roots of unhealthy sugar-cane in Cuba included *Pratylenchus* sp., *Aphelenchus* sp., *Aphelenchoides* sp., *Meloidogyne* sp. and *Radopholus similis*. Brief descriptions are given of the damage caused by *Pratylenchus* and of the chief characters of the nematode genera. Mention is made of non-parasitic genera encountered. *Aphelenchus* is considered a facultative parasite.

M. T. Franklin

- 1298—POWELL, N. T. & NUSBAUM, C. J., 1958. [Plant Pathology, North Carolina State College, Raleigh, N.C.] "The effect of root-knot nematode resistance on the incidence of black shank in tobacco." [Abstract.] *Proceedings. Association of Southern Agricultural Workers*, 55th Annual Convention (1958), p. 220.

[This abstract also appeared in *Phytopathology*, 1958, **48**, 344. For abstract see Helm. Abs., **27**, No. 142j.]

- 1299—ROTHACKER, D., 1958. [Institut für Pflanzensüchtung Gross-Lüsewitz der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin.] "Beiträge zur Resistenzzüchtung gegen den Kartoffelnematoden (*Heterodera rostochiensis* Wollenweber). III. Untersuchungen über den Einfluss unterschiedlicher Kreuzungspartner auf die Ausbildung verschiedener Knolleneigenschaften bei Kartoffelkreuzungen, zugleich ein Beitrag zur Züchtungsmethodik." *Züchter*, **28** (3), 133–143.

Rothacker emphasizes the importance, in breeding potatoes resistant to *Heterodera rostochiensis*, of preserving the yield and other commercial qualities of the susceptible cultivated parent. Hence he devotes the major part of this paper to describing the tuber qualities of crosses derived from resistant *Solanum tuberosum andigena*. He states, however, that these resistant lines of *andigena*, besides being susceptible to new biotypes of the nematode, show



little resistance to other pests and diseases, and so it is desirable to broaden the source from which nematode resistance is drawn. To this end he gives data on the seed productivity and nematode resistance of various crosses of the nematode-resistant, normally diploid species, *S. vernei*, with the tetraploid *S. tuberosum*, the crossing being achieved with or without the participation of the diploids *S. demissum* and *S. phureja*. He concludes that the resistance of the parent can be transmitted to the offspring, and suggests that a combination of resistant genes from *vernei* and *andigena* may provide a good source of resistance. R. D. Winslow

- 1300**—REYES, M., 1957. [Estación Experimental Agrícola de Tingo María, Peru.] "Ataque de nematodos en las plantaciones de café de Tingo María." **Boletín Trimestral de Experimentación Agropecuaria**, Lima, 6 (2), 14–16.

Reyes describes the symptoms of attack on coffee by the root-knot nematode *Meloidogyne exigua*. The attacked roots are subsequently invaded by fungi and bacteria which may completely destroy the root system. For control of the disease it is recommended that attacked plants be eliminated, the soil sterilized, and healthy plants used for new plantations.

M. T. Franklin

- 1301**—RIGGS, R. D. & WINSTEAD, N. N., 1958. [Plant Pathology, North Carolina State College, Raleigh, N.C.] "Attempts to transfer root-knot resistance in tomato by grafting." [Abstract.] **Proceedings, Association of Southern Agricultural Workers**, 55th Annual Convention (1958), pp. 221–222.

[This abstract also appeared in **Phytopathology**, 1958, 48, 344. For abstract see *Helm. Abs.*, 27, No. 142k.]

- 1302**—SEINHORST, J. W., 1957. [Institute voor Phytopathology, Wageningen, Netherlands.] "*Ditylenchus*: races, pathogenicity, and ecology." **Proceedings of the S-19 Workshop in Phytonematology**, University of Tennessee, July 1–6, 1957, 7 pp.

Seinhorst estimates that there are at least 12 different host plant races of *Ditylenchus dipsaci*. These races are polyphagous and most of them have many hosts in common but different symptoms may be produced on any one host. Also, races can enter plants and cause abnormal symptoms although they are unable to reproduce. Host range knowledge of the various races is of some importance in the use of crop rotation as a measure of control; however, the soil type must be taken into consideration. Results of sampling various soil types at different times of the year are given. These show that on light sandy soils during the autumn, under non-host crops, the population reduction is considerable. After a year or two it is usually safe to grow a host crop. However, on heavy soils the reduction is less whatever cultivation is carried out. The soil population does not usually fall below ten *D. dipsaci* per 500 gm. even after several years and such an infestation can still cause serious damage to host crops.

D. J. Hooper

- 1303**—SHEPHERD, A. M., 1959. [Rothamsted Experimental Station, Harpenden, Herts, U.K.] "The invasion and development of some species of *Heterodera* in plants of different host status." **Nematologica**, 4 (4), 253–267. [German summary pp. 265–266.]

The host-parasite relationship between *Heterodera schachtii* and 13 plant species in the families Chenopodiaceae and Cruciferae was examined. Third-stage larvae were found in all plant species, although often few in number, but no fourth-stage larvae were found in *Beta webbiana*, *B. patellaris*, *B. procumbens*, *Hesperis matronalis* or *Matthiola incana*. No males were found in *B. procumbens*, *H. matronalis* or *M. incana* and only one in *B. webbiana*. No females were found in *B. procumbens*, *B. patellaris*, *H. matronalis* and *M. incana*, very few in *Raphanus sativus*, *Chenopodium album* and *Brassica sinapis*, and only one in *Beta webbiana*. *B. trigyna* was a better host than sugar-beet, and the susceptible species of Chenopodiaceae were more efficient hosts than the susceptible species of Cruciferae. When hatched larvae of *H. schachtii*, *H. rostochiensis* and *H. göttingiana* were added to pots with plants not producing a hatching factor, all species were invaded, although sometimes by only very few larvae. The presence of host roots did not affect the number of larvae of *H. schachtii* which invaded the roots of pea, a plant not producing a hatching factor for this eelworm. Factors affecting the host-parasite relationship are discussed and a modification of Jones' classification of plants into categories of host status is suggested.

A. M. Shepherd

- 1304—SMITH, A. L., 1957. [Cotton Section, U.S. Dept. of Agric., Auburn, Alabama.] "Breeding for resistance to *Meloidogyne* spp." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 5 pp.

Breeding for resistance to root-knot nematodes is important both because of the damage done directly and because the nematodes often intensify other diseases. In breeding work the species of *Meloidogyne* against which resistance is required must be determined. Techniques for infecting all plants in progeny populations must be developed for use in green-house or field. The type of resistance and means for its evaluation must be investigated. Resistant parental material must be found either in established commercial varieties or in wild species. The way in which resistance is inherited must be determined and finally crosses and back-crosses must be made until the desired types are established. A table is given summarizing the available information for ten crop plants on the number of factors determining resistance, whether dominant or recessive and the numbers of chromosomes basic to the genus and in the crop studied. The relative difficulties in breeding for resistance in these crops are discussed.

M. T. Franklin

- 1305—TAMURA, I. & KEGASAWA, K., 1958. [Hokuriku Agricultural Experiment Station, Takadashi, Japan.] [Studies on the ecology of the rice nematode, *Aphelenchoides besseyi* Christie. II. On the parasitic ability of rice nematodes and their movement into hills.] **Japanese Journal of Ecology**, 8 (1), 37-42. [In Japanese: English summary pp. 37-38.]

The percentage survival of actively swimming eelworms was related to the period of time after emerging from the seed soaked in water. As the time increased, the percentage survival decreased at the experimental temperatures of 20°C. to 25°C., 25°C. and 30°C. It is believed that a higher survival rate may occur in the seed-bed because the temperatures are lower than those in this experiment. It was observed that swimming nematodes did not attack the young root of the seedling when it only was dipped into water containing a large population of active eelworms, and the authors conclude therefore that it is other parts of the plant which are attacked. When injured and normal seedlings were planted together the same degree of damage occurred in normal seedlings as in injured ones, and it was therefore concluded that the eelworms moved actively from hill to hill. Moreover, the movement between hills was related to the amount of nitrogenous manure and in the twice-manured group the movement reached a maximum at the first-leaf stage of the seedlings, whereas in the normal group the maximum movement did not take place until the third to fourth-leaf stage.

M. Ichinohe

- 1306—TAMURA, I. & KEGASAWA, K., 1959. [Hokuriku Agricultural Experiment Station, Takadashi, Japan.] [Studies on the ecology of the rice nematode, *Aphelenchoides besseyi* Christie. III. The injured features of the rice plant and the population density of nematodes found in the unhulled rice grain with special reference to the type of the nursery bed.] **Japanese Journal of Ecology**, 9 (1), 1-4. [In Japanese: English summary p. 1.]

In an attempt to devise a nursery bed which will afford some measure of protection for growing rice seedlings against the rice eelworm, the authors have studied two types. In the first the nursery bed was covered with oiled paper while the second was an ordinary irrigated nursery bed. Seeds, either hot-water treated or untreated, were sown in each type of bed adjoining a bed containing the eelworms. After the nursery stage the seedlings were transplanted into experimental pots and plant growth and the eelworm population in unhulled rice grains were studied. The results were as follows: (i) the difference in total number of stems was insignificant between plants from the two types of nursery bed, but the number of injured stems was less in those from the protected bed than from the normal bed. (ii) Few or no eelworms were present in the unhulled grains of the plants from the protected bed but considerable numbers were present in those from the unprotected bed. (iii) Even when injury was not apparent nematodes were present in unhulled rice grains from almost all the stems of plants from the normal bed. The difference between the population density of eelworms in injured and uninjured stems from the same hill was insignificant. The density was higher in the injured hill than in the uninjured one. (iv) When the seedlings were planted in the normal nursery bed the population in unhulled rice grains was higher in the injured hills than in the



uninjured ones, irrespective of whether they had received hot-water treatment or not. When the treated seeds were sown the population density in normal stems from injured hills was lower than in injured stems.  
M. Ichinohe

**1307**—TIKTIN, N. V., 1959. [Resistance to the potato nematode.] *Kartofel*, 4 (1), 47–49. [In Russian.] Tubers and seedlings of various species of wild and cultivated potatoes and their crosses were planted out on soil heavily infected with *Heterodera rostochiensis* cysts, to test for resistance. *Solanum ballsii* and *S. catarrhum* possessed high resistance which was passed on to hybrid progeny. Although whole samples of *S. andigenum* appeared susceptible, individual plants amongst them showed considerable resistance. Resistance was not confirmed in *S. sucrense*.  
G. I. Pozniak

**1308**—WASEEM, M., 1957. "Pathogenicity of root-knot nematodes to selections of *Lespedeza cuneata* (Dum de Cours) G. Don." [Abstract of paper presented at the 1957 Annual Meeting of the Alabama Academy of Science.] *Journal of the Alabama Academy of Science*, 29, 85–86.

Five species of root-knot nematodes (*Meloidogyne incognita*, *M. incognita acrita*, *M. javanica*, *M. arenaria* and *M. hapla*) were tested against six selections of *Lespedeza cuneata*. The lespedeza selections differed significantly in their reactions to the various root-knot species. The lowest leaf and root weights occurred in plants on which the nematodes reproduced most abundantly. To get the best growth of lespedeza on root-knot infested soil it is necessary to know which species of *Meloidogyne* is present so that the least susceptible selection may be grown. This will also give the lowest rate of increase of the nematodes. The experiments indicated the possibility of distinguishing the lespedeza selections by their susceptibility to the various species of root-knot.  
M. T. Franklin

**1309**—YOKOO, T., ABE, K. & OTSUBO, K., 1959. [Faculty of Agriculture, Saga University, Saga-shi, Japan.] [Some experiments on the ecology of the root knot nematode, *Meloidogyne incognita* var. *acrita*.] *Agricultural Bulletin. Saga University*, No. 8, pp. 1–9. [In Japanese: English summary pp. 2–3.]

The infection index of cucumber seedling roots and the number of inoculated adult female worms from tobacco (from 10 to 200 females were used) stand in the relation of  $Y = 0.28X + 31$  (where  $Y$  = mean infection index, and  $X$  = number of females inoculated into one spot). The mean infection index of cucumber seedling roots due to the differences in the proportions of chemical fertilizers (nitrogen: phosphorus: potassium) were found to be as follows: 1:1:1, 31%; 1:1:2, 31%; 1:1:3, 30%; 1:1:nil, 50%; 1:nil:nil, 69%; Nil:1:nil, 39%. The growth of cucumber seedlings was found best in the pot with two parts of potassium and good in that with three parts of potassium. Ten minutes in water at 50°C. and 20 minutes at 45°C. killed females outside galls but 20 minutes at 50°C. was necessary to kill those within galls.  
M. Ichinohe

### Insect-Parasitic Nematoda

See Nos.: 1357, 1358, 1359, 1360, 1368.

### Nematoda Parasitic in other Invertebrates

See Nos.: 1368, 1376, 1377, 1378.

### Control

See also Nos.: 1271, 1274, 1277, 1282, 1286, 1289, 1294, 1295, 1296, 1300, 1302, 1306, 1321.

**1310**—BIRCHFIELD, W. & VAN PELT, H. M., 1958. [State Plant Board of Florida, Gainesville, Fla.] "Thermotherapy for nemas of ornamental plants." [Abstract.] *Proceedings. Association of Southern Agricultural Workers*, 55th Annual Convention (1958), p. 222.

[A fuller account of this abstract appeared in *Plant Dis. Repr.*, 1958, 42, 451–455. For abstract see *Helm. Abs.*, 27, No. 54s.]

- 1311**—CARVALHO, J. C., 1958. [Instituto Adolfo Lutz, São Paulo, Brazil.] “Influência de alguns fatores na fumigação do solo.” *Revista de Agricultura. São Paulo*, **33** (2), 79–86. [English summary pp. 84–85.]  
Carvalho describes a local experiment to control root nematodes, using D-D at 15 U.S. gal. per acre, applied 12 in. deep with tractor-mounted machinery. The resulting lack of control was attributed to the low dosage and the deep placement. J. E. Peachey
- 1312**—FOSTER, H. H. & COHOON, D. F., 1958. [Botany Department, Clemson Agricultural College.] “Post-plant fumigation for the control of peach root-knot in South Carolina.” [Abstract.] *Proceedings. Association of Southern Agricultural Workers*, 55th Annual Convention (1958), p. 221.  
[This abstract also appeared in *Phytopathology*, 1958, **48**, 342. For abstract see Helm. Abs., **27**, No. 142f.]
- 1313**—JOHNSON, L. F., 1959. [University of Tennessee, Knoxville, Tennessee, U.S.A.] “Effect of the addition of organic amendments to soil on root knot tomatoes. I. Preliminary report.” *Plant Disease Reporter*, **43** (10), 1059–1062.  
The influence of dried crop residues introduced into pots of soil infested with root-knot nematode [species not stated] was studied. Johnson found that all the types of residue he used reduced the number of nematode galls per plant. Greatest control of nematodes was obtained when the residues were left in the soil for 30 weeks, the maximum time interval employed in these experiments. H. R. Wallace
- 1314**—KELSHEIMER, E. G., 1958. [Gulf Coast Experiment Station, Bradenton, U.S.A.] “Yields of shallots affected by soil pesticide treatments.” *Proceedings of the Florida State Horticultural Society*, **71**, 54–55.  
Kelsheimer describes the eelworm attack of shallots (*Allium ascalonicum*) by stubby root, sting and root-knot nematodes. Vapam at 10 U.S. gal. per acre as a pre-plant soil treatment was found to give best yield effect compared to Mylone, Telone, V-C 13 or parathion granules. J. E. Peachey
- 1315**—LAUTZ, W., 1958. [United States Department of Agriculture, Sanford, U.S.A.] “Chemical control of nematodes parasitic on turf and sweet corn.” *Proceedings of the Florida State Horticultural Society*, **71**, 38–40.  
Lautz describes experiments to control plant-parasitic nematodes of turf and in sweet corn land using Nemagon, Telone, PRD experimental nematocide and Mylone. Most of these treatments at various rates as pre-plant applications, gave reductions in plant-parasitic nematodes four months afterwards. Significant reductions persisted for eight months with Nemagon emulsion at 4 U.S. gal. per acre, Telone at 20 U.S. gal. per acre and Mylone at 555 lb. per acre but the effect was expected to disappear within a few more months. PRD at 20 or 40 lb. per acre and Nemagon emulsion at 8 U.S. gal. per acre, as turf treatments, significantly reduced eelworm populations for two and four months respectively. J. E. Peachey
- 1316**—McFADDEN, S. E. & KERR, S. H., 1958. [Florida Experiment Station, Gainesville, U.S.A.] “Effects of soil mixtures and nematicidal drenches on production of Happiness rose.” *Proceedings of the Florida State Horticultural Society*, **71**, 441–445.  
McFadden & Kerr found that nematicidal drenches with Nemagon at 40 lb. (technical) per acre and V-C 13 at 215 lb. (technical) per acre applied twice in 1956, significantly increased yields of saleable flowers of “Happiness” rose in Florida. The yield response of parathion treated roses was not significantly different from the controls. The authors conclude that soil drenches of V-C 13 and Nemagon can be safely used around established rose plants. J. E. Peachey
- 1317**—NIELSEN, L. W. & SASSER, J. N., 1957. [Plant Pathology Department, North Carolina State College, Raleigh, N.C., U.S.A.] “The relationship of nematocides, dosage, carrier and soil types to the control of root knot in sweet potato.” [Abstract.] *Proceedings of the Association of Southern Agricultural Workers*, 54th Annual Convention (1957), p. 221.  
[This paper also appears in *Phytopathology*, **47**, 314. For abstract see Helm. Abs., **26**, No. 131h.]



- 1318**—NUTTER, G. C. & CHRISTIE, J. R., 1958. [Florida Agricultural Experiment Station, Gainesville, U.S.A.] "Nematode investigations on putting green turf." **Proceedings of the Florida State Horticultural Society**, **71**, 445-449.

Nutter & Christie describe nematode control studies carried out in 1957 and 1958 on an experimental putting green. Populations of *Belonolaimus longicaudatus*, *Criconemoides* spp., *Hoplolaimus tylenchiformis* and *Dolichodorus* sp. doubled in one year despite a 1957 drench treatment with V-C 13 at 20 U.S. gal. per acre. In 1958 Nemagon at 5 U.S. gal. per acre caused a reduction in nematode populations, most marked eight weeks after treatment, with the exception of the stubby root nematode which built up again. In addition to nematicidal treatment effects, nematode populations were influenced by nitrogen source. The authors state that close mowing, soil aeration, moist soil, high volume application of the nematicide and an immediate water seal are essential for the successful treatment of established turf.

J. E. Peachey

- 1319**—OVERMAN, A. J., 1958. [Gulf Coast Experiment Station, Bradenton, U.S.A.] "Effectiveness of various soil fumigants in commercial production of chrysanthemums." **Proceedings of the Florida State Horticultural Society**, **71**, 394-400.

Overman describes efforts to evaluate soil treatments for chrysanthemum beds to protect them from damage by weeds, soil-borne diseases, *Belonolaimus* sp., *Trichodorus* sp., other ectoparasites and root-knot nematodes. Methyl bromide gas (2.0 lb. per 100 sq. ft.) and Mylone (300 lb. per acre, active material) gave superior crop response. Nemagon and EDB were better nematicides when injected rather than drenched. Vapam was more satisfactory as a drench.

J. E. Peachey

### Miscellaneous

See also Nos.: 1413, 1418, 1427.

- 1320**—DUDDINGTON, C. L., 1957. [The Polytechnic, London, England.] "Organisms of the soil which attack nematodes." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 10 pp.

Duddington limits his discussion to predacious fungi. The subject matter is essentially similar to that in "The Friendly Fungi" [for abstract see *Helm. Abs.*, **26**, No. 486].

A. M. Shepherd

- 1321**—WEHRLI, A., 1958. "Die Bedeutung der Nematoden in der Land-, Garten- und Forstwirtschaft." **Schweizerische Landwirtschaftliche Monatshefte**, **36** (6), 228-229.

This appears to be a semi-popular account of a talk given by Oostenbrink in February, 1958 on the significance of nematodes in agriculture, horticulture and forestry. It deals mainly with the importance of *Heterodera rostochiensis* and certain migratory root nematodes (*Pratylenchus pratensis*, *P. penetrans*, *Paratylenchus*, *Hoplolaimus*) in Holland, and recommends certain chemical, cultural and biological control measures. [Wehrli falls into a not uncommon error when he refers to an annual "Cystenreduktion" of 50 to 60%; this figure really applies to the reduction in the number of encysted eggs and larvae.]

R. D. Winslow

### TAXONOMY

#### Monogenea

See also Nos.: 1454, 1495, 1508.

- 1322**—JAIN, S. L., 1959. [Indian Statistical Institute, Calcutta 35, India.] "*Neosprostonia*, a new name for *Sprostonia* Jain, 1959." **Parasitology**, **49** (3/4), 477.

Jain draws attention to the fact that his genus of fresh-water Tetraonchinae, *Sprostonia* Jain, 1959 is invalid since the name is preoccupied by *Sprostonia* Bikhovski, 1957. He therefore

renames his genus *Neosprostonia*. He further points out that, since his original publication, it has come to his notice that two other genera, *Bychowysella* Akhmerov, 1952 and *Silondotrema* Tripathi, 1957 have almost identical generic characters with his *Neosprostonia*. In his opinion the two later genera must be regarded as synonyms of *Bychowysella* Akhmerov, 1952 which has priority. W. M. Fitzsimmons

## Aspidobothria

*No relevant abstracts in this issue*

## Digenea

See also Nos.: 1345, 1451, 1452, 1461.

- 1323**—BIKHOVSKAYA-PAVLOVSKAYA, I. E. & RIZHIKOV, K. M., 1958. [Zoologicheskii institut, Akademiya nauk SSSR.] [Schistosomatidae of Anseriformes in Yakutiya.] **Parazitologicheskii Sbornik**, **18**, 283–294. [In Russian: French summary pp. 293–294.]

Five species of Schistosomatidae were found in 11 of 17 species of anseriform birds examined in Yakutiya. They were *Bilharziella polonica*, *Dendritobilharzia pulverulenta*, *Trichobilharzia filiformis*, *T. ocellata* and *T. kowalewskii*. A re-examination of *T. ocellata* and *Pseudobilharziella kowalewskii* has shown that males of *T. ocellata* do possess a gynaecophoric canal (contrary to previous descriptions) and that the two genera are identical. Therefore *Pseudobilharziella* is transferred to *Trichobilharzia*, the generic diagnosis of which is appropriately emended. [*Pseudobilharziella* was made a synonym of *Trichobilharzia* by McMullen & Beaver in 1945. For abstract see Helm. Abs., **14**, No. 173a.] The females of *T. kowalewskii* are described for the first time and several new host records are made. G. I. Pozniak

- 1324**—BIKHOVSKAYA-PAVLOVSKAYA, I. E., GINETSINSKAYA, T. A., RIZHIKOV, K. M. & KHOTENOVSKI, I. A., 1958. [Zoologicheskii institut, Akademiya nauk SSSR.] [On the systematic position, morphology and development of *Distoma arenula* Creplin, 1825=*Laterotrema arenula* (Creplin, 1825) Dollfus, 1956.] **Parazitologicheskii Sbornik**, **18**, 321–330. [In Russian: French summary pp. 329–330.]

The authors make a comparative study of the morphological features of *Distoma arenula* as described at various times from different hosts. They argue against its inclusion in *Phaneropsolus* and *Leyogonimus* and agree with Dollfus (1956) that the species belongs to *Laterotrema*. Disagreeing with Skryabin's (1947) placing of this genus in Stomylotrematidae, they transfer it to Lecithodendriidae and revise accordingly the diagnosis of the genus. G. I. Pozniak

- 1325**—BOGITSH, B. J., 1959. [Department of Biology, Georgia Teachers College, Collegeboro, Georgia, U.S.A.] "A new species of *Auridistomum* (Trematoda: Auridistomidae) from snapping turtles of Georgia." **Journal of Parasitology**, **45** (6), 631–634.

Bogitsh describes *Auridistomum georgiense* n.sp. from the small intestines of two *Chelydra serpentina serpentina* in Bulloch County, Georgia. *A. georgiense* can be distinguished from all other previously described forms of *A. chelydrae*, its closest related species, by the lack of a prominent Laurer's canal, the lobed testes, and its greater size. E. I. Sillman

- 1326**—CLARK, W. C., 1958. [Entomology Division, D.S.I.R., P.O. Box 223, Nelson.] "A new cotylocercous cercaria from *Melagraphia aethiops* (Gm.) (Gastropoda)." **Transactions of the Royal Society of New Zealand**, **85** (4), 681–683.

*Cercaria melagraphia* n.sp., a microcotylocercous cercaria from the digestive gland of *Melagraphia aethiops*, is described. It has a light yellow sporocyst, one pair of penetration glands and a pear-shaped single-pointed stylet. The ventral sucker is situated in the centre of the body. No pharynx, gut or cuticular spines were detected. B. L. James



- 1327**—COIL, W. H., 1960. [University of Oklahoma Biological Station, Willis, Oklahoma, U.S.A.] "Studies on two gorgoderid cercariae from Oklahoma with the description of a new species." **Proceedings of the Helminthological Society of Washington**, **27** (1), 39–41.  
*Cercaria papillostoma* n.sp. from the gills of *Pisidium compressum* has from three to four penetration glands and an unusually short stylet. It is characterized also by an inability to swim. The setate papillae of a second [unnamed] gorgoderid cercaria are described. Several types of setate papillae, both single and double, occur on the oral sucker. B. L. James
- 1328**—HUTTON, R. F., SOGANDARES-BERNAL, F. & ELDRED, B., 1959. [Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbour, St. Petersburg, Florida, U.S.A.] "Another species of *Microphallus* Ward, 1901, from the pink shrimp, *Penaeus duorarum* Burkenroad." **Journal of Parasitology**, **45** (5), 490.  
Hutton *et al.* report the finding of a single metacercaria of a second species of *Microphallus* from the muscle tissue of *Penaeus duorarum*; it differs from the first in cyst size, oral sucker to acetabulum ratio, and position of genital pore. E. I. Sillman
- 1329**—ILES, C., 1959. [Joint Fisheries Research Organisation. P.O. Nkata Bay, Nyasaland.] "The larval trematodes of certain fresh-water molluscs. I. The Furcocercariae." **Parasitology**, **49** (3/4), 478–504.  
Eight species of furcocercous cercariae are recorded from fresh-water molluscs in Glamorgan-shire. Three new species of pharyngeal, longifurcous, distome cercariae are described. These are named *Cercaria tetraglandis* n.sp. from *Planorbis corneus*, *C. paracauda* n.sp. from *Lymnaea pereger* and *C. planorbida* n.sp. from *P. planorbis*. *C. vivacis* n.sp. from *Bithymia tentaculata* a pharyngeal, longifurcate, monostome cercaria, is also described. These cercariae are differentiated by the arrangement of spines and penetration gland cells. Detailed descriptions are also given of *C. bilharziellae polonica* Kow. and *C. hamburgensis* Komiya. Both are new records for Britain. Iles demonstrates experimentally that *C. hamburgensis* Komiya is the larva of *Apatemon gracilis minor* Yamaguti. B. L. James
- 1330**—KHALIL, L. F., 1959. [Department of Parasitology, London School of Hygiene and Tropical Medicine, London, W.C.1.] "On a new trematode, *Astiotrema sudanensis*, sp.nov., from a freshwater turtle in the Sudan." **Journal of Helminthology**, **33** (4), 263–266.  
Khalil describes *Astiotrema sudanensis* n.sp. from the intestine of *Trionyx triunguis* (= *nilotica*). Previous reviews of *Astiotrema* are noted [for abstracts see Helm. Abs., **27**, Nos. 69b, 126b] and, on the basis of restudy of specimens, Khalil concludes that *A. odhneri* Bhalerao, 1936 is a synonym of *A. reniferum* (Looss, 1898) Looss, 1900. *A. reniferum* is reported for the first time from the intestine of *Clarias lazera*. A key to the five valid species of *Astiotrema* is given. *A. sudanensis* resembles *A. reniferum* somewhat, but differs from it in having the oral sucker larger than the ventral sucker, vitellaria restricted to the region from acetabulum to anterior testis, and smaller eggs. E. I. Sillman
- 1331**—KRUIDENIER, F. J. & GALLICCHIO, V., 1959. [Department of Zoology, University of Illinois, Urbana, Illinois, U.S.A.] "The orthography of the Brachylaimidae (Joyeux & Foley, 1930); *Brachylaime microti* sp.nov.; *B. rauschi* McIntosh, 1950; and an addendum to Dollfus' (1935) list of *Brachylaime* (Trematoda: Digenea)." **Transactions of the American Microscopical Society**, **78** (4), 428–441.  
Kruidenier & Gallicchio indicate that their analysis of the polyorthography of the brachylaimid trematodes clearly demonstrates the prior and first subsequent use of an arbitrary spelling *Brachylaime*, since apparently neither lapsus nor a desire for correct transliteration and Latinization on the part of the original author (Dujardin) can be incontrovertibly shown. They therefore conclude that since such arbitrary spelling is not prohibited by the International Rules of Nomenclature, the name *Brachylaime* must be accepted, and familial and subfamilial designations must be emended to Brachylaimidae and Brachylaiminae respectively. The original description of *B. rauschi* is supplemented. *B. microti* n.sp. is proposed for brachylaimid trematodes from the pancreatic duct of *Microtus longicaudus baileyi* taken from Swamp Lake, Grand Canyon National Park, Coconino County, Arizona. The new species is distinguished from other species of *Brachylaime* by varying combinations of the following: size of its body and/or eggs; an aspinose cuticula; the relative position of its acetabulum; the absence of a distinct cirrus;

the well developed prostate and/or seminal receptacle; the position of its most anterior uterine loop and/or vitelline follicles; and the absence of any anterior recurving at the bifurcation of the caecum. A table showing key characteristics and host records for species of *Brachylaima* for the period 1935 to 1956 is presented as a supplement to a similar tabulation by Dollfus (1935) of earlier recorded species.

E. I. Sillman

**1332**—PAGGI, L. & BIOCCA, E., 1959. "Su un trematode parassita della volpe in Italia: *Lyperosomum vulpis* n.sp." *Atti della Accademia Nazionale dei Lincei. Rendiconti. Classe di Scienze Fisiche, Matematiche e Naturali. Rome, Serie 8*, **26** (2), 266–271.

*Lyperosomum vulpis* n.sp. is proposed subject to eventual further researches on its life-cycle and experimental infections. 21 foxes (*Vulpes vulpes*) from Central Italy, were found to harbour this trematode. The parasite differs chiefly from the other members of the genus *Lyperosomum* (Dollfus, 1954) by not being very narrow and elongated and by the clearly oblique position of the testes. Diagnostic characteristics as different from those of individual members of the genus and from those of *Dicrocoelioides* are also given.

N. Jones

**1333**—PAO, T. C., 1959. [Chungking Medical College.] "The description of a new schistosome *Schistosoma sinensium* sp.nov. (Trematoda: Schistosomatidae) from Szechuan Province. [Abstract.] *Chinese Medical Journal. Peking*, **78** (3), 278.

Pao states that *Schistosoma sinensium* n.sp. belongs to the *mansoni* group but differs in the morphology of the adults, cercariae and ova. From the description given it would appear that both male and female worms are much smaller than *S. mansoni* but do not differ greatly otherwise. The eggs, obtained from the faeces of white mice, are smaller but the lateral spine appears to be similar. No drawings are given in this abstract. The intermediate host ("Mian-zhu snail") resembles the smooth-shelled *Oncomelania* but its taxonomic position has not yet been clarified.

N. A. Hancock

**1334**—WOOTTON, D. M., 1957. [Marine Biological Laboratory, Woods Hole, Massachusetts, U.S.A.] "Studies on the life-history of *Allocreadium alloneotenicum* sp.nov. (Allocreadiidae: Trematoda)." *Biological Bulletin*, **113** (2), 302–315.

Wootton gives a detailed illustrated description of *Allocreadium alloneotenicum* n.sp. which is characterized by the extreme anterior position of the ventral sucker and the position of the testes. It resembles most closely *A. neotenicum*, from which it differs in the shape of the body, the posterior extent of the vitellaria and caeca, the extent of the excretory bladder and the relative position of the ovary complex and cirrus sac. *A. alloneotenicum* was recovered from the haemocoel of *Linnéphilus* sp. larvae in Cape Cod, Massachusetts. Examination of natural as well as experimental infections showed that the normal intermediate clam host was *Pisidium abditum*. Miracidia hatched in the debris from dead fly larvae or after having passed in the faeces of *Aplexa hypnorum* following ingestion by this snail. Secretions from the apical glands of miracidia were observed to have histolytic action, whereas those of the "penetration" glands were found to produce the cuticle for the sporocyst. Sporocysts gave rise to mother rediae; these produced daughter rediae which liberated ophthalmoxiphidiocercariae and, occasionally, more rediae. Attempts to infect *Eucalia inconstans*, *Fundulus heteroclitus* and *Salvelinus fontinalis* with caddis fly larvae infected with *A. alloneotenicum* were unsuccessful.

N. Jones

**1335**—YANG, F. H., 1959. [Studies on strigeid trematodes from birds. I. On a new genus and three new species in Diplostomatidae.] *Acta Zoologica Sinica*, **11** (4), 482–498. [In Chinese: English summary pp. 496–498.]

Yang describes five species of bird strigeids belonging to the family Diplostomatidae, of which three are new. *Mesoophorodiplostomum cheni* n.sp. is found in the intestine of *Nycticorax nycticorax* in Canton. It has similarities to *M. pricei* but can be distinguished by having the ovary in front of the anterior testis instead of between the two testes. *Choanochenia hwananensis* n.g., n.sp., is found in the intestine of *Halcyon pileata* from Canton. The new genus is distinguished from the related genera *Diplostomum*, *Allodiplostomum*, *Uvulifer*, *Crassiphiala* and *Pseudodiplostomum* by the presence of a permanent bursa copulatrix and further distinguished from the last three by the presence of pseudo-suckers and vitellaria in the fore-body. *Allodiplostomum fuscai* Chatterji, 1950 is moved to the new genus. *Choanochenia stomospinosa* n.sp.



also comes from the intestine of *H. pileata* in Canton. It is distinguished from *C. hwananensis* in its smaller body size, adhesive organ armed with numerous spines and conical shape of the caudal end of the body ventrally. A number of *Neodiplostomum cochleare* specimens were collected from the intestine of a bird, and *N. palumbarii* from the intestine of *Haliaeetus leucogaster*.  
L. S. Yeh

## Cestodaria

*No relevant abstracts in this issue*

## Cestoda

See also Nos.: 1440, 1455.

**1336**—JOHRI, G. N., 1959. [Dept. of Zoology, University of Lucknow, India.] "Descriptions of two amabiliid cestodes from the little grebe, *Podiceps ruficollis*, with remarks on the family Amabiliidae Braun, 1900." *Parasitology*, **49** (3/4), 454–461.

Johri describes *Schistotaenia indica* n.sp. and redescribes *Tatria acanthorhyncha*. The following characters combine to distinguish *S. indica* from other species in the genus: the worms are 16 to 30 mm. long and lack a neck region, segmentation starting immediately behind the scolex; the shape and size of the 20 hooks are distinctive, each hook measuring 0.019 to 0.021 mm. from the guard end to the tip of the blade and they are arranged in a single row at the base of the otherwise unarmed rostellum; the testes number 30 to 34 in each segment; a well developed cirrus sac is present measuring 0.37 to 0.40 mm. long and with a maximum width of 0.095 mm. Johri considers that there are sufficient differences between *Amabilia* and the other two genera, *Schistotaenia* and *Tatria*, which are included in the family Amabiliidae, for them to be separated into the two subfamilies, namely, Amabiliinae Braun, 1900, type genus *Amabilia*, and Schistotiinae n.subf., type genus *Schistotaenia*. These two subfamilies are distinguished primarily by the male genital organs and genital pores being double in each segment in the Amabiliinae whereas they are single in each segment of the Schistotiinae. [According to the International Code of Zoological Nomenclature this name should be Schistotaeniinae.]  
I. L. Owen

**1337**—LYNSDALE, J. A., 1959. [Department of Parasitology, London School of Hygiene and Tropical Medicine, London.] "On a new species of *Proteocephalus* from Brazil." *Journal of Helminthology*, **33** (2/3), 145–150.

Having outlined the history of the cestode family Proteocephalidae, Lynsdale describes a specimen from the fish *Platystoma* sp. from Brazil. *Proteocephalus platystomi* n.sp., total length 25 mm., is distinguished by a scolex, diameter 870  $\mu$ , lacking an apical sucker and with no neck; 35 to 50 testes which are arranged in two lateral fields which merge in front of the young uterus; the cirrus pouch, which measures 290  $\mu$  to 310  $\mu$  by 90  $\mu$  to 100  $\mu$ , with a large external seminal vesicle; the ovary, which is posterior and bilobed and the uterus which has 12 to 13 branches on each side. The eggs show a curious arrangement in pairs within the outer egg membrane and the embryonic hooks appear to be lacking. *P. platystomi* most closely resembles *P. jandia* Woodland, 1924, also from an Amazonian siluroid. There are four figures and 14 references.  
J. Mahon

**1338**—METTRICK, D. F., 1959. [Department of Zoology, University College of Rhodesia and Nyasaland, Salisbury, Southern Rhodesia.] "A new tapeworm, *Inermicapsifer rhodesiensis* sp.nov. from a scaly ant-eater, *Manis temminckii*, in Southern Rhodesia." *Journal of Helminthology*, **33** (4), 273–276.

Mettrick describes *Inermicapsifer rhodesiensis* n.sp. from *Manis temminckii*. The new species appears to be most closely related to *I. arvicanthidis*, from which it can be distinguished by the size of the cirrus sac, the size of the testes, and the relative proportions of the various organs of the body, as shown in a comparative table.  
E. I. Sillman

- 1339—METTRICK, D. F., 1959. [Department of Zoology, University College of Rhodesia and Nyasaland, Salisbury, Southern Rhodesia.] "A new cestode, *Anomotaenia prinopsia* sp.nov. from the straight crested helmet shrike, *Prinops plumata*, in Southern Rhodesia." *Journal of Helminthology*, 33 (4), 277–280.

Mettrick describes *Anomotaenia prinopsia* n.sp. from *Prinops plumata*. The new species is differentiated from the 17 other species of the genus recorded from passerine birds by the combination of the following characters: possession of 21 rostellar hooks arranged in a double row and measuring 0.039 to 0.040 mm. in length; there being 27 to 30 testes in a mature segment; and the size of the cirrus sac which is 0.154 to 0.172 mm. long by 0.026 to 0.027 mm. wide [see also Helm. Abs., 27, No. 245f]. E. I. Sillman

- 1340—RAUSCH, R., 1957. [Arctic Health Research Center, U.S. Public Health Service, Anchorage, Alaska.] "Distribution and specificity of helminths in microtine rodents: evolutionary implications." *Evolution*. Lancaster, Pa., 11 (3), 361–368.

The author reviews the taxonomic status of anoplocephaline cestodes of microtine rodents (lemmings and voles) and discusses some of the evolutionary and zoogeographical implications of distribution and host-occurrence of these and other helminths. Of the genus *Andrya* Railliet, 1883, five species are considered valid: *A. macrocephala* Douthitt, 1915; *A. primordialis* Douthitt, 1915; *A. montana* Kirshenblat, 1941; *A. arctica* Rausch, 1952; and *A. bairdi* Schad, 1954. Of the genus *Paranoplocephala* Luehe, 1910, six species are regarded as valid: *P. omphalodes* (Hermann, 1783); *P. blanchardi* (Moniez, 1891); *P. infrequens* (Douthitt, 1915); *P. variabilis* (Douthitt, 1915); *P. lemni* Rausch, 1952; and *P. neofibrinus* Rausch, 1952. *Andrya caucasica* Kirshenblat, 1938 and *A. bialowizensis* Sołtys, 1949, are regarded as synonyms of *P. infrequens*. Three species, *A. macrocephala*, *P. omphalodes* and *P. infrequens* are holarctic in distribution, occurring mainly in species of *Microtus*. The uniformity of microtine rodents as hosts for various helminths is discussed. It is concluded that *Dicrostonyx* is the most isolated genus from this standpoint, having two nematodes which have not been recorded from members of other genera, and harbouring few helminths in common with others. From the present concept of Pleistocene glaciations, it is concluded that *P. omphalodes* and *P. infrequens* reached the St. Matthew Islands, Bering Sea, as parasites of a vole from which *Microtus abbreviatus* has evolved. It appears that this vole arrived on these islands before North America was invaded, in the late Pleistocene, by the palaearctic *M. oeconomus* and *Clethrionomys rutilus*. The present known distribution of *P. omphalodes* in North America corresponds roughly to that of *M. oeconomus* in that continent. W. M. Fitzsimmons

- 1341—SANDEMAN, I. M., 1959. [Institut de Zoologie, Université de Neuchâtel, Switzerland.] "*Capsulata edenensis* gen. et. sp.nov. a new cestode with an unusual type of growth, from *Limosa lapponica* (L.); with systematic notes on the genera *Southwellia* Moghe, 1925 and *Malika* Woodland, 1929." *Journal of Helminthology*, 33 (2/3), 171–188.

Sandeman's specimens, which he names *Capsulata edenensis* n.g., n.sp., reach a length of 75 mm., comprising some 300 segments and the scolex; this has a diameter 200 to 280  $\mu$  with 16 rostellar hooks 37  $\mu$  to 45  $\mu$  long, arranged in a double crown. The genital pores are unilateral, the ducts passing between the excretory vessels. 30 to 45 testes surround the female organs and the cirrus pouch measures 100  $\mu$  to 185  $\mu$  and contains a minutely spined cirrus. The uterus appears as a reticulum and later forms 4 to 15 egg capsules, each containing 40 to 120 eggs. This material most closely approaches the dipylidine genera *Southwellia*, *Malika* and *Similuncinus* Johnston, 1909. After re-examining type material, Sandeman transfers the type species *Southwellia gallinarum* to the genus *Dilepis*, and finds that the type species *Malika oedinenus* has two crowns of rostellar hooks. Of the six species in the genus, *M. kala-wewaensis*, *M. himantopodis* and *M. zeylanica* are identical with *M. oedinenus* Woodland, 1929 and also with *Dilepis odhneri* Fuhrmann, 1909. *M. odhneri* (Fuhrmann, 1909) thus becomes type. *M. pittae* remains as the only other representative of the genus, *M. skrjabini* being synonymous with *Dilepis limosa*. Sandeman distinguishes his material from *Similuncinus* (also possibly a synonym of *Dilepis*) and *Malika* and defines a new genus *Capsulata*, with *C. edenensis* as the type. The large numbers of *C. edenensis* enabled Sandeman to investigate the growth pattern, which proves to be of a rare type, segmentation taking place from a diffuse area in the posterior region of the young worm. An increase in size follows and external and



internal segmentation is completed at the posterior end last. Maturation is from the posterior end forward and there is a subsequent loss of gravid segments until the end of the worm's reproductive activity. There are 12 figures, two tables and 16 references. J. Mahon

**1342**—SANDEMAN, I. M., 1959. [Institut de Zoologie, Université de Neuchâtel, Switzerland.] "Une espèce nouvelle du genre *Proterogynotaenia* Fuhrmann." *Annales de Parasitologie Humaine et Comparée*, **34** (3), 265–270.

Sandeman describes *Proterogynotaenia dougi* n.sp., several specimens of which were found in the intestine of a golden plover, *Pluvialis apricaria* (L.), shot on the estuary of the River Eden in Scotland. The new species is distinguished from other members of the genus by the size, number and arrangement of the rostellar hooks, which are in two rows comprising six small hooks  $13\mu$  to  $14.5\mu$  in length arranged in a dorsal and ventral group, alternating with 11 to 13 large hooks  $37\mu$  to  $42\mu$  long; by the number of testes (26 to 37, average 32, arranged in two groups, one on either side of the uterus); and by the size of the cirrus pouch which is  $230\mu$  to  $280\mu$  long. I. C. Williams

### Acanthocephala

**1343**—BELOPOLSKAYA, M. M., 1958. [Kafedra zoologii bespozvonochnikh LGU.] [The parasite fauna of birds in the Sudzkhinsk reserve (Maritime Territory). II. Acanthocephala.] *Parazitologicheskii Sbornik*, **18**, 304–320. [In Russian: German summary pp. 319–320.]

Seventeen species of Acanthocephala were found in 30 of 720 birds (148 species) examined at the Sudzkhinsk sanctuary. The fauna included four new species. (i) *Polymorphus ardeae* n.sp., from *Ardea cinerea jouyi* and *Egretta intermedia intermedia*, is nearest to *P. brevis* but differs from the known species of the genus by having 20 longitudinal rows of 14 to 15 proboscis hooks and the body spines in two anterior bands. (ii) *P. cincli* n.sp. from *Cinclus pallasii* has 12 to 14 longitudinal rows of proboscis hooks; the worms were located in the intestine one behind the other in groups. (iii) *Corynosoma sudsuche* n.sp. from *Clangula histrionica pacifica* resembles *Corynosoma osmeri*, but has a pear-shaped body which is wide anteriorly and the 8th to 11th proboscis hooks in each row lack bases. (iv) *Plagiorhynchus lemnisalis* n.sp. is described from two immature females found in *Charadrius dubius curonicus* and is characterized by the long lemnisci (5.1 mm.) and 13 proboscis hooks in each row. Some unidentified immature specimens of *Centrorhynchus* were present in *Numenius phaeopus variegatus* and *Squatarola squatarola*. The male of *Corynosoma phalacrocoracis* is now described from one specimen found in *Phalacrocorax carbo sinensis*. A new host, *Anas poecilorhyncha zonorhyncha*, is recorded for *Polymorphus magnus*, while *P. capellae*, *Corynosoma mergi* and *Centrorhynchus turdi* are new for birds in Russia. G. I. Pozniak

**1344**—GOLVAN, Y. J., 1959. [Institut de Parasitologie de la Faculté de Médecine de Paris.] "Acanthocephales du genre *Corynosoma* Lühe, 1904, parasites de mammifères d'Alaska et de Midway." *Annales de Parasitologie Humaine et Comparée*, **34** (3), 288–321.

Golvan discusses the biology and systematics of the genus *Corynosoma*, gives a host-parasite list of the species found in birds and an account, together with a dichotomous key, of those species found in marine mammals. A collection of *Corynosoma* spp. from marine mammals, made by Rausch in Alaska, and including two new species is reported on. In *C. alaskensis* n.sp., from the intestine of *Phocaena vomerina* from Hooper Bay, the female measures 13.0–14.7 mm. in length and the male 9.0–10.6 mm., both sexes possess genital spines, and the proboscis is short and armed with 20 to 21 rows each of 10 to 12 spines, varying in length from 28–62  $\mu$ . In *C. rauschi* n.sp., from the intestine of *Monachus schauinslandii* from Midway Island, the female is 3.3–4.0 mm. long and the male 2.8–3.6 mm., the proboscis is up to 1.0 mm. in length and armed with 16 rows each of 19 to 22 spines varying in length from 27  $\mu$  to 55  $\mu$ , cuticular spines are present on the ventral surface from the anterior to the posterior region, and genital spines are present in both sexes. The two other species discussed are *C. strumosum* from *Mustela vison* from Nunivak Island and *C. villosum* from *Enhydra lutris* from Montague Island. I. C. Williams

**1345**—MACHADO F., D. A., 1959. [Instituto Oswaldo Cruz, Rio de Janeiro, D.F., Brazil.] "*Neoechinorhynchus spectabilis* sp.n. (Neoechinorhynchidae, Acanthocephala)." **Revista Brasileira de Biologia**, **19** (2), 191–194.

Machado Filho describes *Neoechinorhynchus spectabilis* n.sp. from *Curimata elegans* Steind. collected in Emas, Piraçununga, São Paulo, Brazil. The majority of the material was in a poor state of preservation but several males and females were present. The new species is distinguished from others in the genus by the shape of the proboscis hooks, the presence of a body of unknown function beside the proboscis sac and by the subcuticular nuclei and the asymmetrical lemnisci. Other species which show an arrangement of the first row of hooks similar to that in the new species are *N. rutili* (Müller, 1780), *N. emydis* (Leidy, 1851), *N. macronucleatus* Machado Filho, 1954 and *Eocollis arcanus* Van Cleave, 1947. C. A. Wright

## Nematoda

See also Nos.: 1154, 1191, 1256, 1262, 1446, 1453, 1456, 1473, 1578.

**1346**—ALLEN, M. W., 1957. [University of California and Agric. Exper. Station, Berkeley, California.] "Principles of nematode taxonomy." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1–6, 1957, 6 pp.

Allen discusses the principles of nematode taxonomy and points out some of the difficulties inherent in taxonomic studies. The terms polytypic, sympatric and allopatric species are defined and discussed. An increase in the use of subspecies is to be expected. The designation of types when describing new species, free exchange of specimens and compliance with the Rules of Zoological Nomenclature is advocated. D. J. Hooper

**1347**—ALWAR, V. S., SENEVIRATNA, P. & GOPAL, S., 1959. [Madras Veterinary College, Madras, India.] "*Indofilaria pattabiramani* n.g., n.sp., a filarid from the Indian elephant (*Elephas maximus*), causing haemorrhagic dermatitis." **Indian Veterinary Journal**, **36** (9), 408–414.

Alwar *et al.* describe and illustrate a new filariid nematode, *Indofilaria pattabiramani* n.g., n.sp., which causes parasitic haemorrhagic dermatitis in elephants of Madras State. Only female specimens, which were recovered from slightly raised nodules on the skin, were found. The species and genus are considered to be distinct by reason of the division of the oesophagus into two parts, the atrophied posterior intestine, the presence of lips around the mouth, the absence of a trifid tip to the tail, and the absence of cuticular papilliform thickenings at the anterior end of the body. W. G. Inglis

**1348**—ASADOV, S. M., 1958. [*Gelanocaulus boievi* n.g., n.sp. from the lungs of *Rupicapra rupicapra* in Azerbaidzhan.] **Izvestiya Akademii Nauk Azerbaidzhanskoi SSR. Seriya Biologicheskikh i Sel'skokhozyaistvennikh Nauk**, Year 1958, No. 3, pp. 57–65. [In Russian.]

*Gelanocaulus boievi* n.g., n.sp. is described and figured from the lungs of *Rupicapra rupicapra*. The new genus is placed in the Protostrongylinae and differs from the other two genera *Protostrongylus* and *Spiculocaulus* by the doubling of the entire gubernaculum (including the head). Other characteristics are the strongly reduced dorsal ray in the male and the presence of two well marked caudal papillae in the female. *P. rushi* is transferred to *Gelanocaulus* as a new combination. G. I. Pozniak

**1349**—DAS, V. M., 1960. [Department of Zoology, University College of Science, Osmania University, Hyderabad, A.P., India.] "Studies on the nematode parasites of plants in Hyderabad (Andhra Pradesh, India)." **Zeitschrift für Parasitenkunde**, **19** (6), 553–605.

Das collected nematodes associated with roots of *Sorghum vulgare*, *Oryza sativa*, *Pennisetum typhoides*, *Lactuca sativa*, *Musa sapientum*, *Beta vulgaris*, *Solanum melongena*, *S. lycopersicon*, *S. tuberosum*, *Capsicum annuum*, *Ricinus communis*, *Hibiscus esculentus*, *Arachis hypogaea*, *Cucumis sativus* and *C. maxima*. He describes and figures 19 new species, out of 27 species encountered, and one new genus. A number of new host records are made. The following are the new species: *Tylenchus goodeyi* n.sp., has finer striations and a shorter tail than *T. bryophilus*; *T. striatus* n.sp. has coarser striae and a narrower lateral field than *T. goodeyi*; *Leiperotylenchus leiperi* n.g., n.sp. is small (up to 0.4 mm. long), has the orifice of the dorsal



oesophageal gland a spear-length from the spear base, an adanal bursa and a single ovary; *Tylenchorhynchus dactylurus* n.sp. differs from *T. macrurus* by having four incisures and from *T. magnicauda* by the narrower tail; *T. digitatus* n.sp. has a shorter and more conoid male tail than *T. dactylurus*; *Helicotylenchus crenatus* n.sp. differs from *H. nannus* in that the outer incisures are crenate; *Radopholus mucronatus* n.sp. where the bursa extends nearer to the terminus than in other species; *Pratylenchus brevicercus* n.sp. differs from *P. brachyurus* in the shape of the head; *P. indicus* n.sp., has a more truncated female tail than *P. pratensis*; *Aphelenchus mirzai* n.sp. differs from *A. avenae* in general shape and the male having only three pairs of caudal papillae; *A. maximus* n.sp. has more incisures than *A. avenae* and a different pattern of male caudal papillae; *Paraphelenchus basili* n.sp. is unique in having a large terminal mucro; *Nothotylenchus buckleyi* n.sp. is smaller than any of its relations; *Aphelenchoides singhi* n.sp. differs from *A. fragariae* in having four incisures; *A. hyderabadensis* n.sp. has a short flagellum-like tail similar to *A. mucronatus* but with an offset head; *A. asterocaudatus* n.sp. has a star-shaped mucro as in *A. besseyi* and *A. coffeae* [it is very close to *A. nonveilleri* Andrassy, 1959 but only two incisures; *A. brevionchus* n.sp. resembles *A. blastophthorus* but its stylet is only half as long; *A. brevicaudatus* n.sp. is close to *A. heterophallus* and *A. huntii* but its stylet is knobbed; *A. longiurus* n.sp. differs from *A. tenuicaudatus* by its longer tail and post-vulval sac.

J. B. Goodey

- 1350**—FOTEDAR, D. N., 1959. [Department of Zoology, S. P. College, Srinagar, Kashmir, India.] "On a new species of the genus *Cosmocerca* Diesing, 1861 from a toad, *Bufo viridis*, in Kashmir." *Journal of Helminthology*, **33** (2/3), 161–170.

Fotedar describes a new nematode, *Cosmocerca kashmirensis* n.sp., from the rectum of *Bufo viridis* from Srinagar, Kashmir. The species is characterized by the presence of 19 plectanes, a poorly developed anterior pharynx, well developed spicules which are heavily cuticularized and by the absence of a distinct caudal spine in both sexes. The relationships of the genus *Cosmocerca* are discussed and the species of the genus are listed. It is suggested that *C. banyulensis* Chabaud & Campana-Rouget, 1955 and *C. propinqua* Johnston & Simpson, 1943 should probably be referred to the genus *Cosmocercella*.

W. G. Inglis

- 1351**—FRANKLIN, M. T., 1959. [Rothamsted Experimental Station, Harpenden, Herts, U.K.] "*Nacobbus serendipiticus* n.sp., a root-galling nematode from tomatoes in England." *Nematologica*, **4** (4), 286–293. [German summary p. 293.]

*Nacobbus serendipiticus* n.sp. caused galling of the roots of tomatoes in a glass-house in Berkshire. The mature females are irregularly spindle-shaped, without an elongated posterior region, and have a well developed oesophageal corpus and muscular bulb. The stylet is 19–22  $\mu$  with conspicuous knobs. The males are slender with tylenchoid spicules and a small bursa surrounding the tail which is about as long as the anal body diameter. The newly hatched larvae have blunt tails with phasmids midway and the lateral field has four incisures.

M. T. Franklin

- 1352**—FRANKLIN, M. T., THORNE, G. & OOSTENBRINK, M., 1959. [Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, U.K.] "Proposal to stabilise the scientific name of the cereal-root eelworm (Class Nematoda)." *Bulletin of Zoological Nomenclature*, **17** (3/5), 76–85.

The cereal-root eelworm has been known alternatively as *Heterodera major* and *H. avenae*. The history of its nomenclature is reviewed and a summary is given of the usage of the two names since 1940. In the light of this information a proposal is made to the International Commission on Zoological Nomenclature that neither the name *minor* O. Schmidt, 1930, nor the name *major* O. Schmidt, 1930 be used in preference to the name *avenae* Wollenweber, 1924, by those zoologists who consider that all of these names apply to the same taxon. It is further requested that the nominal species *Heterodera avenae* is to be interpreted by reference to the neotype which is briefly described. This is a lemon-shaped cyst with brown to black wall 9  $\mu$  thick with conspicuous punctuation and vulval slit 12  $\mu$  long. Eggs 126  $\mu$  long by 56  $\mu$  wide. Larvae 530  $\mu$  long with slightly curved tails, tapering, rounded heads and stylets 25  $\mu$  long.

M. T. Franklin

- 1353—FREITAS, J. F. TEIXEIRA DE & MACHADO DE MENDONÇA, J., 1959. "Nota prévia sobre nova *Capillaria* parasita de jandaia (Nematoda, Trichuroidea)." *Atas da Sociedade de Biologia do Rio de Janeiro*, 3 (1), 2-3.

Freitas and Mendonça describe, without figures, a new species of nematode, *Capillaria plagiatia* n.sp., from the intestine of *Aratinga cactorum caixana* from Brazil. The species differs from *C. hirundinis* (Rudolphi, 1819) by the relationship between the two parts of the body and by the distribution of the papillae on the male tail and from *C. pirangae* Durbin, 1952 by having a shorter spicule, the greater length of the female and by the structure of the eggs.

W. G. Inglis

- 1354—FREITAS, J. F. TEIXEIRA DE & MACHADO DE MENDONÇA, J., 1959. "Nota prévia sobre novo nematódea tricostrongilídeo parasito de tamanduá-bandeira." *Atas da Sociedade de Biologia do Rio de Janeiro*, 3 (3), 1-4.

Freitas & Mendonça describe, without figures, a new species of nematode, *Graphidiops dissimilis* n.sp., from the stomach of *Myrmecophaga tridactyla* from Brazil. The species is easily distinguished by the presence of two barbs on the proximal third of the spicules, and by the presence of distinct cuticular peri-vulvar ridges on the females.

W. G. Inglis

- 1355—GAGARIN, V. G., ABLASOV, N. A. & CHIBICHENKO, N. T., 1957. [Helminth fauna of wild birds in southern Kirgizia.] *Trudi Instituta Zoologii i Parazitologii. Akademiya Nauk Kirgizskoi SSR*, No. 6, pp. 105-120. [In Russian.]

Gagarin *et al.* describe and illustrate two new helminth species found during examination of some 400 wild birds in southern Kirgizia in 1954-55. They are: (i) *Diplotriaeana tinnunculi* n.sp., from the thoracic cavity of *Falco tinnunculus*, which differs from *D. falconis* (Connal, 1912) by having a larger body and spicules, a significantly greater distance between the opening of the vulva and the anterior end and a smaller distance between the anus and the posterior end; from most other species of the genus it differs in the greater number of coils in the smaller spicule; (ii) *Brachylecithum schamurati* n.sp., from the liver of *Emberiza bruniceps*, was distinguished by the large acetabulum and body size, few large vitellaria and by the small size of eggs. The total incidence of infection of the birds examined was 64-66% with about 29 nematode, 13 trematode, 19 cestode and two acanthocephalan species.

N. Jones

- 1356—KRALL, E. L., 1958. [Institut zoologii i botaniki, Akademiya Nauk Estonskoi SSR.] [*Paraxonchium striatum* n.g., n.sp. (Nematoda, Belondiridae)—a new free-living soil nematode from Estonia.] *Izvestiya Akademii Nauk Estonskoi SSR. Seriya Biologicheskaya*, Year 1958, No. 4, pp. 272-276. [In Russian: German & Estonian summaries pp. 275-276.]

*Paraxonchium striatum* n.g., n.sp. is described and figured from the soil of a potato field. The new genus is nearest to *Axonchium* and *Belondira*. Its chief differential characters are the plump body, the characteristically thick spear with an aperture of half its length, the oesophagus not offset by a constriction, paired reflexed ovaries, a conical tail and wide lateral fields.

G. I. Pozniak

- 1357—KLOSS, G. R., 1959. "Nematóides parasitos de Gryllotalpoidea do Brasil. (Nota prévia)." *Atas da Sociedade de Biologia do Rio de Janeiro*, 3 (1), 9-12.

Nematode parasites of the Gryllotalpoidea include species of one known and four new subfamilies of three families of the Oxyuroidea. The new subfamily, Schubartnematinae of the Lepidonematidae has, as its type, the new species, *Schubartnema schubarti* n.sp. from the hind gut of *Gryllotalpa hexadactyla* Perty at Boracéia. In the Thelastomatidae, Gryllophilinae n.subf. is proposed with *Gryllophila* Basir, 1942 as the type, and Cameroniinae n.subf. with *Cameronia* Basir, 1948, as type. The new subfamily Pulchrocephalinae in the Hystrignathidae includes the type genus *Pulchrocephala* Travassos, 1925, *Indiana* Chakravarty, 1943, *Chitwoodiella* Basir, 1948, and *Singhiella* Rao, 1958. New subfamilies are based on differences in the structure of the spicules, the male tail and the eggs.

H. E. Welch

- 1358—KLOSS, G. R., 1959. "Nematóides parasitos de Gryllotalpoidea (Orthoptera). 2a. Nota prévia." *Atas da Sociedade de Biologia do Rio de Janeiro*, 3 (2), 3-4.

A new species, *Pulchrocephala simulatilis*, from the hind gut of *Gryllotalpa hexadactyla* Perty, 1832, from Boracéia, is described and distinguished from *P. pulchrocephala* Travassos, 1925,



by the structure of the cephalic ornamentation, the more delicate body of the female, and the lack of transverse rows of papillae on the male tail.

H. E. Welch

**1359**—KLOSS, G. R., 1959. "*Schwenkiella* Basir, 1956 sinônimo de *Cephalobellus* Cobb, 1920 (Nematoda, Thelastomatidae)." **Atas da Sociedade de Biologia do Rio de Janeiro**, 3 (3), 4-5.

Kloss considers the separation of *Schwenkiella* Basir, 1956, and *Cephalobellus* Cobb, 1920, on the single character of tail length unjustified, and makes the former a synonym of the latter with the new combinations, *C. robustum* (Leidy, 1850), *C. icemi* (Schwenk, 1926) and *C. longicaudatum* (Meyer, 1896).

H. E. Welch

**1360**—KLOSS, G. R., 1959. [Instituto Oswaldo Cruz, Rio de Janeiro.] "Novo nematóide parasito de *Helochares pallipes* (Brullé, 1838) e alótipos machos de *Cameronia biovata* Basir, 1948 e *Singhiella singhi* Rao, 1958 (Nematoda, Thelastomatidae e Hystriognathidae)." **Revista de Brasileira de Biologia**, 19 (2), 161-164.

Kloss describes a new oxyuroid, *Zonothrix helocharesae* n.sp. from the hind gut of *Helochares pallipes* (Brullé, 1838) (Hydrophilidae) collected near Luihares, Brazil. Males of *Cameronia biovata* Basir, 1948, from the hind gut of *Scapteriscus tenuis* Scudder (Gryllotalpidae) and of *Singhiella singhi* Rao, 1958, from the hind gut of *Gryllotalpa hexadactyla* var. *spinosa* Chopard (Gryllotalpidae) are described for the first time. These specimens were collected near Itaguai and Salesopolis, Brazil, respectively.

H. E. Welch

**1361**—KIRYANOVA, E. S., 1959. [Zoologicheski Institut, Akademiya nauk SSSR, Leningrad.] [On the systematics of the genus *Heterodera* Schmidt, 1871.] **Zoologicheski Zhurnal**, 38 (11), 1620-1626. [In Russian; English summary p. 1626.]

Kiryanova has carefully studied the external cuticle in the region of the anus and vulva of *Heterodera rostochiensis*, *H. tabacum* and *H. schachtii*, and describes and illustrates her findings. Having encountered characteristic differences in the structure of the cuticle, she concludes that it provides a good diagnostic feature for the differentiation of the species of *Heterodera*.

G. I. Pozniak

**1362**—K'UNG, F. Y., 1959. [The validity of *Oesophagostomum hsiungi* Ling, 1959, and a description of a new nematode genus.] **Acta Zoologica Sinica**, 11 (4), 507-508. [In Chinese; English summary p. 508.]

Ling in 1959 [in **Acta Zoologica Sinica**, 11, 24-28] described a new species of nematode, *Oesophagostomum hsiungi* from the domestic pig in China. It differed from other species of *Oesophagostomum* in having no cervical swelling and groove. K'ung in this paper says that *O. hsiungi* does not agree with the definition of the genus and proposes a new genus *Wuia* for its reception. [This species appears to agree closely with *Bourgelatia diducta* and the generic name *Wuia* is preoccupied by *Wuia* Fowler, 1934.]

L. S. Yeh

**1363**—LIPPARONI, E., 1957. "Sopra alcuni esemplari femmine di anchilostoma, riportabile ad *A. iperodontatum*, parassita di *Caracal nubicus*." **Atti della Accademia Nazionale dei Lincei. Rendiconti. Classe di Scienze fisiche, matematiche e naturali**. Rome, Serie 8, 22 (4), 539-540.

Lipparoni describes the female of *Ancylostoma iperodontatum* Le Roux & Biocca, 1957, four specimens of which were found in the small intestine of *Caracal nubicus* near Villaggio Duca degli Abruzzi (Somalia) in 1951. This is said to be a new host record and hitherto only the male of this species has been known. Some of the characteristics are: vulva situated near the point separating the middle third from the posterior third of the body, gonoducts forming numerous circumvolutions and reaching the vicinity of the posterior margin of the oesophagus, eggs measuring 58-76  $\mu$  by 39-48  $\mu$  and tail terminating in a short filament.

N. Jones

**1364**—LOOF, P. A. A., 1959. [Landbouwhogeschool, Wageningen, Netherlands.] "Miscellaneous notes on the genus *Tylenchorhynchus* (Tylenchinae: Nematoda)." **Nematologica**, 4 (4), 294-306. [German summary p. 305.]

Loof describes two new species of *Tylenchorhynchus*, comments on the morphology and nomenclature of others, gives an emended key to the genus and discusses its geographical distribution. *T. bursifer* n.sp. is characterized by the peculiar shape of the female and juvenile tails,

the posterior half being narrow, curved and bursate; the male tail is normal and the species otherwise conventional. *T. microphasmis* n.sp. differs from *T. lamelliferus* (de Man) in having a more offset lip region, more slender body, long tapering tail and straight bursal edge, but the outstanding feature is the minuteness of the phasmid. The description of *T. acti* Hopper is enlarged, and specimens from Ceylon of *T. nudus* Allen are shown to be smaller than, and to differ in some other respects from the American material. *Aphelenchus dubius* Steiner and possibly *T. graminicola* Kiryanova are identified with the smaller form of *T. macrurus* (Goodey) for which no lectotype has yet been selected. Whereas only two species of the genus were listed by Allen (1955) as known on both sides of the Atlantic [for abstract see Helm. Abs., 24, No. 256a], nine are now listed as common to the Old and New Worlds. R. D. Winslow

**1365**—LORDELLO, L. G. E. & ZAMITH, A. P. L., 1959. [Escola Superior de Agricultura "Luiz de Queiroz", Piracicaba, S. Paulo.] "Observações sobre o gênero *Butlerius* de nematódeos de vida livre." *Revista Brasileira de Biologia*, 19 (2), 177–182. [English summary pp. 181–182.]

*Butlerius singularis* n.sp. is described and figured. It has longer and thicker cephalic setae and a longer body than *B. butleri*, it has no paired cephalic setae as does *B. filicaudatus*, and differs from *B. gerlachi* in the absence of longitudinal, cuticular striations and the shape of the oesophagus. It is unique in the possession of "paraphasmids"—organs in the position of phasmids but formed of thick walled ampullae joined to a short duct. *B. brevispiculatus* is renamed *Diplogaster brevispiculatus* (Stekhoven & Teunissen, 1938) n.comb. *B. okai* becomes the type of a new genus *Butlerioides* n.g. as *Butlerioides okai* (Rahm, 1938) n.comb. This is separated from *Butlerius* by the absence of a gubernaculum. J. B. Goodey

**1366**—PETTER, A. J., 1959. [Institut de Parasitologie de la Faculté de Médecine de Paris.] "Deux nouveaux genres de nematodes atractides, parasites du daman des rochers (*Procavia rufigeops* (Ehrenberg))." *Bulletin de la Société Zoologique de France*, 84 (2/3), 195–204.

Petter describes two new nematodes of the family Atractidae: *Grassenema procaviae* n.g., n.sp. and *Nouvelnema cyclophoron* n.g., n.sp. from *Procavia rufigeops* from Tibesti which died in the Parc Zoologique de Vincennes. The first species was recovered from the stomach and the second from the caecum and rectum. *Grassenema* is characterized by a hexagonal mouth opening and an eversible buccal cavity, the head bears eight small cuticular structures and the female is monodelphic with a posterior vulva. *Nouvelnema* is characterized by an elongate mouth bounded by two lateral lips, there is a ring of strongly striated cuticle about the middle of the length of the oesophagus and the vulva is anterior to the middle of the body. In spite of a careful search no males were found. W. G. Inglis

**1367**—OSHMARIN, P. G., 1959. [Far Eastern Branch of the Academy of Sciences of the USSR (Vladivostok).] [*Alcedospirura collaricephala* n.g., n.sp., a new genus and species of bird nematode from the Far East.] *Zoologicheskii Zhurnal*, 38 (9), 1310–1312. [In Russian: English summary p. 1312.]

Oshmarin describes and illustrates *Alcedospirura collaricephala* n.g., n.sp. (Spirurata) from specimens found in *Alcedo attis* in the Far East. The species is characterized by four cuticular cordons, arranged in pairs on the anterior end, behind which is a collar of smooth cuticle. The deirids are small with narrow alae running posteriorly from them. The genus differs from its closest relatives, *Syncuaria*, *Chevreuria* and *Skrijabinoclava*, particularly in the form of the cephalic elaborations. W. G. Inglis

**1368**—RAO, P. N., 1958. [Department of Zoology, University College of Science, Osmania University, Hyderabad.] "Studies on the nematode parasites of insects and other arthropods." *Arquivos do Museu Nacional. Rio de Janeiro*, 46, 33–84.

Rao deals with 23 species representing 20 genera and four families of oxyuroids from five insects, one diplopod, and one chilopod collected at Hyderabad, India. All species are described in detail with measurements and drawings, and compared to related species. The new family, Travassosinematidae, based on the presence of cuticular ornamentation on the head of female nematodes, includes as type the new genus and species, *Travassosinema travassosi* from the millipede (*Spirostreptus* sp.), *Pulchrocephala* Travassos, 1925, and *Indiana* Chakravarty, 1943. Five new genera and species are also described: *Singhiella singhi*, *Pteronemella macropapillata*,



*Isobinema flagellocerca*, and *Psilocephala psilocephala* from the intestine of the cricket (*Grylotalpa africana*); and *Coronostoma singhi* from *Spirostreptus* sp. Other new species are *Rondonema spinifera* from the chilopod (*Rhisida longipes*), and *Hammerschmidtella manohari* and *Thelastoma indica* from *Spirostreptus* sp. in India. Male allotypes are described for *Indiana grylotalpae* Chakravarty, 1943, *Binema korsakowi* (Sergiev, 1923) Basir, 1956, and *B. mirzaia* (Basir, 1942) Basir, 1956 from *G. africana*, and *Blattophila suppelaima* Basir, 1941 from the cockroach *Supella supellectillum*. Eight new records for India are also given: *Mirzaella asiatica* Basir, 1942, *Chitwoodiella ovofilamenta* Basir, 1948, *Gryllophila skrabini* (Sergiev, 1923) Basir, 1956, and *Cameronia biovata* Basir, 1948 from *G. africana*; *Hammerschmidtella diesingi* (Hammerschmidt, 1838) Chitwood, 1932 from the cockroaches *Periplaneta americana* and *Blatta orientalis*; *Leidyneema appendiculata* (Leidy, 1850) Chitwood, 1932 from *B. orientalis*; *Schwenkiella icemi* (Schwenk, 1926) Basir, 1956 from *P. americana*; *Pseudonymus hydrophili* (Galeb, 1878) Stiles & Hassall, 1905 from an aquatic beetle at Vizianagram, India. *B. ornata* Travassos, 1925 is also recorded from Hyderabad.

H. E. Welch

**1369**—SENEVIRATNA, P., 1959. [Royal Veterinary College, London.] "Studies on the family Filaroididae Schulz, 1951." *Journal of Helminthology*, **33** (2/3), 123–144.

Seneviratna reviews the nematode family Filaroididae and gives descriptions and original figures for *Oslerus osleri* (Cobbold, 1879), *Filaroides martis* (Werner, 1782), and *Vogeloides ramamujacharii* Alwar, Lalitha & Seneviratna, 1958. A key is given to the subfamilies and genera of the family which is split into five subfamilies, of which one is new, thus: (i) Filaroidinae with one genus—*Filaroides* (eight species); (ii) Angiostrongylinae with five genera—*Angiostrongylus* (eight species), *Aelurostrongylus* (three species), *Pulmostrongylus* (two species), *Guritia* (one species) and *Rodentocaulus* (one species); (iii) Marsupostrongylinae n.subf. with two genera—*Marsupostrongylus* (one species) and *Plectostrongylus* (one species); (iv) Oslerinae Khera, 1956, *emend. nov.* with two genera—*Oslerus* (two species, of which *O. kreisi* (Dougherty, 1943) is cited as n.comb.) and *Anafilaroides* (one species); (v) Vogeloidinae with three genera—*Vogeloides* (seven species), *Metathelazia* (four species) and *Pneumospirura* (two species). The subfamily Marsupostrongylinae is characterized by a very reduced caudal bursa, the fact that the dorso-dorsal and dorso-lateral rays are represented by papillae, the equality of the six lips and the fact that the anus and vulva are very close together. Oslerinae is characterized by a anterior end with a protrusible rostrum of six equal lips, an excretory system of three large unequal vesicles, no caudal bursa and post-cloacal papillae generally arranged in pairs and variable in number. The anus and vulva open into a common depression guarded by three flaps. These forms may be viviparous or ovoviviparous, develop in molluscs, and are parasites of carnivores.

W. G. Inglis

**1370**—SHEN, S. S., WU, S. C. & YEN, W. C., 1959. [Parasitology Department, Institute of Zoology, Academia Sinica.] [A new nematode, *Ostertagia* (*Grosspiculagia*) *skrabini* n.sp. from the abomasum of the Chinese goat.] *Acta Zoologica Sinica*, **11** (4), 565–571. [In Chinese: English summary pp. 568–569.]

Nematodes collected from the abomasum of the goat *Capra hircus* in China are described as *Ostertagia* (*Grosspiculagia*) *skrabini* n.sp. In a lengthy discussion it is differentiated from all known species in the subgenus.

L. S. Yeh

**1371**—SHOHO, C., 1958. [Nakayama-Soen, Takarazuka, Hyogo-Ken, Japan.] "Studies on the identity of *Setaria* species from the peritoneal cavity of American moose (*Alces a. gigas*) and white tailed deer (*Odocoileus virginianus*)."  
*Ceylon Veterinary Journal*, **6** (3/4), 43–47.

Shoho describes and illustrates some female specimens of a *Setaria* species (Nematoda) recovered from *Alces a. gigas* in Alaska (one entire specimen and three posterior parts) and from *Odocoileus virginianus* at Ontario, Canada (one female). It is suggested that the specimens might belong to *Setaria bidentata* but no conclusion can be reached without males since the specimens could represent a new species. [The lengths of the entire specimens are given as 9.0 mm. and 10.7 mm. but this must be an error, probably for 90 mm. and 107 mm.]

W. G. Inglis

- 1372—SIDDIQI, M. R., 1960. [Muslim University, Aligarh, U.P., India.] "Two new species of the genus *Trichodorus* (Nematoda: Dorylaimoidea) from India." **Proceedings of the Helminthological Society of Washington**, 27 (1), 22-27.

*Trichodorus mirzai* n.sp. and *T. acaudatus* n.sp. are described and figured. The former was collected from around roots of *Brassica oleracea* at Aligarh and the latter from a soil sample of sugar-cane at Coimbatore, India. *T. mirzai* n.sp. is closest to *T. minor* but differs in the presence of abundant males, a well set-off oesophagus, and oöcytes not arranged in a single file. *T. acaudatus* is distinguished by its long body and almost terminal anus in the female. It is closest to *T. atlanticus* but possesses fewer supplements and shorter striated spicules.

R. W. Timm

- 1373—SOMMERVILLE, R. I., 1959. [McMaster Animal Health Laboratory, C.S.I.R.O., Parramatta Road, Glebe, N.S.W., Australia.] "*Trichostrongylus drepanoformis* n.sp. (Nematoda: Trichostrongylidae) from the duodenum of the sheep (*Ovis aries*)."

**Journal of Parasitology**, 45 (4), 446-448.

Sommerville describes a new species of nematode, *Trichostrongylus drepanoformis*, based on two males recovered from the duodenum of a sheep in New South Wales (formerly at Cunnamulla, Queensland). The species is characterized by the form of the spicules which are bent about the middle of their lengths at an angle of about 90°. The gubernaculum has an entirely smooth dorsal edge but the ventral edge is irregular. These characters serve to distinguish the species from *T. thomasi*, *T. tenuis* and *T. medius*, the three species which *T. drepanoformis* most resembles.

W. G. Inglis

- 1374—TAYLOR, A. L., 1957. [Section of Nematology, U.S. Dept. of Agric., Beltsville, Maryland.] "Heterodera taxonomy." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 12 pp.

Taylor briefly reviews the taxonomic history of the genus *Heterodera* and outlines the life-history for *Heterodera* spp. The species of *Heterodera* are listed in tabular form with their respective type host and locality. Species previously referred to the genus and their present position are also given. The various shapes, structure and cuticular patterns exhibited by mature cysts of the different species are illustrated and discussed. There is a key to the species of *Heterodera* and a list of the principle plant hosts for each species.

D. J. Hooper

- 1375—TENORA, F. & BARUŠ, V., 1957. [Katedra zoologie Vysoké Školy zemědělské a lesnické, Brno.] "Přispěvek k poznání helminthofauny králíka divokého *Oryctolagus cuniculus* L." **Zoologické a Entomologické Listy**, 6 (4), 341-357. [German & Russian summaries pp. 355-357.]

*Mozgovoyia pectinata moravica* n.subsp. was found in two out of 120 wild rabbits examined in Czechoslovakia during 1954-56. This subspecies resembles *M. pectinata americana* but differs from it principally by the body length and the number of testes. *Dicrocoelium dendriticum* was found in the rabbit for the first time in Moravia. The incidence of infection with other helminths was: *Taenia pisiformis* (bladder worms) 47.5%; *Ctenotaenia ctenoides* 44.1%; *Passalurus ambiguus* 72.5%; *Graphidium strigosum* 50.8%; *Trichostrongylus retortaeformis* 20.8% and *Protostrongylus commutatus* 0.8%.

N. Jones

- 1376—TIMM, R. W., 1960. [Notre Dame College, Dacca, East Pakistan.] "The genus *Perodira* Baylis, 1943 (Nematoda: Drilonematidae), with a description of a new species." **Proceedings of the Helminthological Society of Washington**, 27 (1), 77-80.

*Perodira pheretimae* n.sp. is described and figured. It differs from *P. alata* in the narrower body and smaller size, the more anterior vulva and the greater proportion of length to breadth of the ova. The genus is emended and in particular a pair of large subventral excretory cells running anterior and posterior to the excretory pore are described. The type host is the earthworm *Pheretima posthuma*, collected from Subida, Dacca, East Pakistan.

R. W. Timm

- 1377—TRAVASSOS, L. & KLOSS, G. R., 1959. "Nematódeo de artrópodos." **Atas da Sociedade de Biologia do Rio de Janeiro**, 3 (2), 1-2.

Two new oxyuroids, *Dudekemia longicauda* n.sp. and *D. longispiculata* n.sp. from the hind gut of the diplopods, *Rhinocricus padbergi* Schubart, 1930, and of *R. electrofasciatus* Schubart, 1957, respectively are described and distinguished from *D. glabra* (Dollfus, 1952) by the lengths of the spicules and tail.

H. E. Welch



**1378**—TRAVASSOS, L. & KLOSS, G. R., 1959. "Nematódeos de artrópodos." *Atas da Sociedade de Biologia do Rio de Janeiro*, **3** (4), 4-5.

*Ichthyocephalus anteriori* n.sp. is described from *Rhinocricus urukumui* from an Indian village on the river Tapirapé, tributary of the Araguaya, Brazil. The size of the males (3.83 mm. to 5.41 mm. by 0.14 mm. to 0.21 mm.) differentiates the new species from *I. ichthyocephalus*, and the length of the spicules (0.093 mm. to 0.112 mm.) distinguishes it from *I. eglei*. From *I. ichthyocephaloides* it differs in having no cuticular formations. M. McKenzie

**1379**—WAHID, S., 1959. [Department of Parasitology, London School of Hygiene and Tropical Medicine, London, W.C.1.] "On a new species of the genus *Thelazia* Bosc 1819, from a hooded vulture (*Necrosyrtes monachus*) from Uganda." *Journal of Helminthology*, **33** (4), 257-262.

Wahid describes a new species of nematode, *Thelazia ugandensis*, from the eye of *Necrosyrtes monachus* in Uganda. The species differs from the other known species of the genus in having a very long left spicule (3.6 to 3.9 mm.), and by the presence of many pairs of caudal papillae, ten pre-cloacal on the left side and eleven on the right. W. G. Inglis

**1380**—WHITEHEAD, A. G., 1959. [East African Agriculture and Forestry Research Organization, Kenya.] "The root-knot nematodes of East Africa. I. *Meloidogyne africana* n.sp., a parasite of Arabica coffee (*Coffea arabica* L.)." *Nematologica*, **4** (4), 272-278. [French summary p. 277.]

*Meloidogyne africana* n.sp. occurs widely in the Meru district of Kenya on seedlings in coffee nurseries, causing stunting of the plants and small galls on the roots. It is characterized by the cuticular pattern in the female perineal region which consists of closely spaced smooth striae forming a whorl around the tail. The lateral fields in this region are relatively wide and marked only by very faint, short striae. In the male the lateral field is marked by five incisures in the middle of the body and four posteriorly. In the tail region the lateral field is crossed by the transverse striae. The phasmids are very close to the tail tip in male, female and larva. The male head bears six lips, the laterals larger than the rest and each lip having a papilla. The author believes that this species may lie close to the ancestor of the genus since the perineal pattern of the adult female partly resembles that of the pre-adult female of *M. javanica*.

M. T. Franklin

**1381**—WILLIAMS, J. R., 1960. [Sugar Industry Research Institute, Réduit, Mauritius.] "Studies on the nematode soil fauna of sugar cane fields in Mauritius. 4. Tylenchoidea (*partim*)." *Occasional Paper. Mauritius Sugar Industry Research Institute*, No. 4, 30 pp.

Williams records *Meloidogyne javanica*, *M. incognita acrita*, *Radopholus similis*, *Pratylenchus zaei*, *P. brachyurus*, *Helicotylenchus parvus* n.sp., *H. nannus*, *H. ?erythrinae*, *Scutellonema ?brachyurum*, *Tylenchorhynchus brevilineatus* n.sp., *T. curvus* n.sp., *T. crassicaudatus* n.sp., *Criconemoides sphaerocephalum*, *C. mauritiense* n.sp., and *Hemicyclophora ?membranifer* from the roots of sugar-cane in Mauritius. The new records are described and figured. The small size (length=250  $\mu$ ) of *H. parvus* n.sp. is unique. The orifice of the dorsal oesophageal gland is halfway between the spear base and the median bulb, the ovaries are paired and very little developed and the tail relatively long. [These characters suggest an immature female *Rotylenchulus* and Williams (in litt.) agrees.] *T. brevilineatus* n.sp. (male and female) has eight longitudinal striations [seen in lateral view—presumably sixteen or so in section] on the anterior part of the body extending from spear base to isthmus base which distinguishes it from other tylenchorhynchids. *T. curvus* n.sp. (female) differs from *T. acutus* in the shape of the spear base and the absence of any overlap of oesophagus and intestine. *T. crassicaudatus* n.sp. (male and female) is very close to *T. martini* but has spermathecae and more anterior phasmids. Males are as common as females. *Criconemoides mauritiense* n.sp. has about 140 annules but differs from *C. parvum* in the form and annulation of the anterior end, position of vulva and dividing terminus. There are photographs of perineal patterns of *M. javanica* and *M. incognita acrita*. J. B. Goodey

**1382**—WU, S. C., YEN, W. C. & SHEN, S. S., 1959. [Parasitology Department, Institute of Zoology, Academia Sinica.] [A survey of *Setaria* in the Chinese domestic animals with descriptions of two new species.] *Acta Zoologica Sinica*, **11** (4), 577-585. [In Chinese: English summary pp. 582-583.]

Six species of *Setaria*, viz., *Setaria labiato-papillosa*, *S. equina*, *S. digitata*, *S. marshalli*,

*S. tangi* n.sp. and *S. erschovi* n.sp. were collected from cattle, sheep and horses in various parts of China. Descriptions are given for the two new species only. *Setaria tangi* n.sp., based on nine females collected from cattle (*Bos taurus*) and sheep (*Ovis aries*) resembles *S. tundra* as both species have four pairs of head papillae. In *S. tundra* all four pairs are rounded, whereas in *S. tangi* two pairs of papillae are rounded and two pairs pointed. *Setaria erschovi* n.sp., from cattle, based on two female specimens is unique in having nine pairs of head papillae and two lateral cuticular structures near the oral opening. It therefore differs from all known *Setaria* spp. L. S. Yeh

1383—YEN, W. C. & WU, S. C., 1959. [Parasitology Department, Institute of Zoology, Academia Sinica.] [A new nematode *Epomidiostomum petalum* n.sp. (Nematode: Trichostrongylidae) from domestic duck.] *Acta Zoologica Sinica*, 11 (4), 572–576. [In Chinese: English summary p. 575.] Nematodes collected from the gizzard of the domestic duck, *Anas platyrhynchos* var. *domestica* in Anhwei were found to be new, and accordingly named *Epomidiostomum petalum* n.sp. The new species differs from the seven known species in the head, having six similarly shaped trifid spines and the buccal cavity with six papillae, the length of the spicular spikes and the bursal membrane pattern. L. S. Yeh

### Nematomorpha

*No relevant abstracts in this issue*

### Hirudinea

*No relevant abstracts in this issue*

### Pentastomida

1384—NICOLI, R. M. & GOLVAN, Y., 1959. [Laboratoire de Parasitologie, Faculté de Médecine de Marseille.] “Sur une petite collection de Porocephalidae (Pentastomida) en provenance de l’Angola. Première note.” *Bulletin de la Société de Pathologie Exotique*, 52 (2), 145–146.

Nicoli & Golvan record the following species of Porocephalidae from Angola: *Porocephalus subulifer subulifer* (adults from *Bitis arietans*) and *Nettorhynchus armillatus armillatus* (adults from *Python sebae* and *Bitis gabonica*; young forms from *Nandinia binotata*, *Ichneumia albicauda*, *Herpestes ichneumon*, *Atilax paludinosus*, *Galerella* sp., *Felis pardus*, *F. leo*, *Sylvicapra grimmia* and man). The human record involved a male of the batshok (tshokwe) tribe from Chingufo, north-east of Lunda, in whom the young pentastomids were found in the peritoneum.

J. M. Watson

### Miscellaneous

See Nos.: 1427, 1445.

## INVERTEBRATE INTERMEDIATE HOSTS

### Arthropoda

See also Nos.: 1020, 1070, 1074, 1114, 1115, 1116, 1122, 1327, 1334, 1455, 1466, 1468, 1476, 1482, 1499, 1507, 1515.

1385—IVASHKIN, V. M., 1959. [Gelmintologicheskaya laboratoriya AN SSSR.] [Parabronemiasis in ruminants.] *Veterinariya*, 36 (6), 26–28. [In Russian.] Ivashkin reports that *Lyperosia titillans*, which lays its eggs on the faeces of ruminants, is the intermediate host of *Parabronema skrjabini*. Its distribution corresponds with that of



*P. skrjabini* in Central Asia. *L. irritans* larvae could not be infected with the eggs of *P. skrjabini*. First-stage *Parabronema* larvae usually appear in the larvae of *L. titillans*, second-stage larvae in the pupae and the infective stage in the imagines. In the laboratory metamorphosis of the fly was completed after 15 to 17 days at 20°C. to 28°C., but under natural conditions development took 28 to 32 days. The final host was infected via the mouth and the larvae then developed slowly in the abomasum. *L. titillans* were found infected from the middle of June until their death at the end of September. The maximum incidence of parabronemiasis among animals, which was observed from the middle of July until the middle of August, coincided with the maximum incidence of *L. titillans*. Phenothiazine, given orally at doses (per kg. body-weight) of 7.5 mg. to sheep, 20 mg. to cattle and 30 mg. or over to camels destroyed *L. titillans* larvae developing in the faeces and *Parabronema* eggs. N. Jones

**1386**—MANSON-BAHR, P., 1959. "The story of *Filaria bancrofti*. Part IV. Mosquito intermediaries of *W. bancrofti*." *Journal of Tropical Medicine and Hygiene*, **62** (6), 138–145.

Manson-Bahr gives a list of mosquitoes in which complete development of *Wuchereria bancrofti* occurs and geographical lists of the vectors of nocturnal and non-periodic filariases. He brings together information on the distribution in the Pacific area of the subspecies of *Aedes scutellaris* and other mosquitoes, and their ability to support development of non-periodic and nocturnal filariae. W. A. F. Webber

**1387**—NAKASE, M., 1958. [Studies on the cystic larvae parasitic in crabs in Shikoku District. Report I. *Paragonimus westermani*.] *Shikoku Acta Medica*, **13** (4), 494–506. [In Japanese: English summary p. 494.]

During the period from March 1953 to December 1956, 14 different kinds of fresh-water crabs, totalling 4,284 in number, all of them found in rivers in Shikoku Island, were examined for metacercariae. Six species occurred. Larvae of *P. westermani* were found but those of *P. ohirai* and *P. ilokisuensis* were not. *P. westermani* larvae were seen in *Eriocheir japonicus* and *Potamon dehaani* in both Tokushima and Kochi Prefectures. Incidence was lower in the former. It was higher in Kochi Prefecture than in Tokushima Prefecture as far as *E. japonicus* was concerned. The incidence of *P. westermani* in *E. japonicus* in Tokushima Prefecture ranged from 37.5% for the Naka River to 0% for the Yoshino River. No larva of *P. westermani* was seen in *Cambarus clarkii* found in Shikoku Island. As many as 57 metacercariae of *P. westermani* were found in *E. japonicus*, mostly in the gills, but a few in the liver and muscles. Y. Yamao

**1388**—NAKASE, M., 1958. [Studies on the cystic larvae parasitic in crabs in Shikoku District. Report 2. *Macrorchis spinulosus*, *Microphalloides japonicus*, and a kind of *Levinseniella*.] *Shikoku Acta Medica*, **13** (4), 507–519. [In Japanese: English summary p. 507.]

Encysted trematode larvae found in fresh-water crabs in Shikoku Island were investigated. Among those found were the larvae of *Macrorchis spinulosus*, *Microphalloides japonicus* and *Levinseniella* sp., as well as those of *P. westermani* mentioned in the first report. The distribution of these forms in Shikoku Island was clarified. Y. Yamao

**1389**—NAKASE, M., 1958. [Studies on the cystic larvae parasitic in crabs in Shikoku District. Report 3. *Metacercaria shikokuensis* n.sp.] *Shikoku Acta Medica*, **13** (4), 520–527. [In Japanese: English summary p. 520.]

A new species of encysted larval trematode in the liver of crabs in Shikoku Island was named *Metacercaria shikokuensis*. This species is found in the crabs all over Tokushima Prefecture with the exception of the southern part of the region. The infection rate was 29.2% at the highest and 1.3% at the lowest. In the neighbouring Kochi Prefecture, however, no instance of this metacercaria was found in the crabs. Y. Yamao

**1390**—WILLIAMS, P., 1959. [Helminthiasis Research Unit, West African Council for Medical Research, Kumba, Southern Cameroons.] "The effect of atmospheric pressure on *Aedes aegypti* exposed to *Dirofilaria immitis* and on *Glossina morsitans* exposed to *Trypanosoma rhodesiense* or *T. congolense*." *Annals of Tropical Medicine and Parasitology*, **53** (4), 451–464.

*Aedes aegypti* exposed to *Dirofilaria immitis*, and *Glossina morsitans* exposed to *Trypanosoma rhodesiense* and *T. congolense* were maintained in desiccator jars at atmospheric pressures

corresponding to sea level, 1,300 ft. above sea level and 18,500 ft. above sea level. The form of the survival curves of *A. aegypti* which had been fed on dogs with lower and higher numbers of microfilariae in the peripheral blood, and of *G. morsitans* which had been fed on guinea-pigs infected with *T. rhodesiense* are shown. The survival rates of the insects were the same at reduced atmospheric pressure as at normal atmospheric pressure, and the parasites were able to reach the infective stage in the normal time after normal development at the reduced pressures.

W. A. F. Webber

## Mollusca

See also Nos.: 1020, 1026, 1028, 1225, 1326, 1329, 1332, 1334, 1400, 1414, 1424, 1462, 1470, 1474, 1478, 1481, 1485, 1505, 1546, 1551.

**1391**—BRYGOO, E. R., 1957. "Mollusques et bilharzioses humaines à Madagascar. Enquêtes épidémiologiques 1955-1957." *Archives de l'Institut Pasteur de Madagascar*, **26**, 41-112.

Brygoo reviews briefly the history of schistosomiasis in Madagascar and he then presents the results of surveys on the distribution of both the intestinal and urinary forms of the disease and of the fresh-water snails of the island. The distribution of the snails is presented in maps and tables. The numbers of different types of habitat occupied by each species and the frequency with which the species are found associated with each other are also given. The species of snail discussed are *Biomphalaria madagascariensis* (Smith), *Bulinus mariei* (Crosse), *B. liratus* (Tristram), *Anisus crassilabrum* (Morelet), *Lymnaea hovarum* (Tristram) and *Melanoides tuberculata* (O. F. Muller). On the basis of the distribution of the snail species *B. mariei* is thought to be the intermediate host of *S. haematobium* and *Biomphalaria madagascariensis* of *S. mansoni*.

C. A. Wright

**1392**—BRYGOO, E. R. & CAPRON, A., 1959. [Institut Pasteur de Madagascar, Tananarive, Madagascar.] "Rôle d'hôte intermédiaire de *Biomphalaria madagascariensis* (Smith, 1882) dans le cycle de *Schistosoma mansoni* Sambon, 1907 à Madagascar. Démonstration dans le foyer d'Ambositra." *Bulletin de la Société de Pathologie Exotique*, **52** (3), 281-283.

Brygoo & Capron have demonstrated both by morphological studies of the cercariae shed and by animal infection experiments that *Biomphalaria madagascariensis* is the normal intermediate host for *Schistosoma mansoni* in the Ambositra district of Madagascar. They also report the presence of an apharyngeal longifurcous cercaria in the same snail.

C. A. Wright

**1393**—CAPRON, A. & BRYGOO, E. R., 1959. [Institut Pasteur de Madagascar, Tananarive, Madagascar.] "Contribution à la connaissance de la bilharziose intestinale à *Schistosoma mansoni* à Madagascar. Etude du foyer d'Ambositra. I. Enquête malacologique et parasitologique." *Bulletin de la Société de Pathologie Exotique*, **52** (4), 503-515.

Capron & Brygoo have carried out a detailed survey of the focus of *Schistosoma mansoni* at Ambositra in Madagascar. They report that few of the habitats investigated had infected snails, that the over-all infection rate in the snails was low (0.8%) but the rate in the infested places was much higher (8.5%). Cercariae tentatively referred to *Echinostomum revolutum*, *Paramphistomum cervi* and *Halipegus* sp. were also found in *Biomphalaria madagascariensis*.

C. A. Wright

**1394**—LARIVIÈRE, M. & CHARNIER, M., 1957. "Contribution à l'étude des bilharzioses au Sénégal. Recherche des mollusques sur la presqu'île du Cap Vert." *Bulletins et Mémoires de l'Ecole Nationale de Médecine et de Pharmacie de Dakar*, **5**, 336-339. [English, Spanish & Portuguese summaries pp. 338-339.]

Malacological investigations of various water collections (mainly stagnant), carried out in the dry season in the region of Dakar (Cape Verde) revealed the presence of: *Anisus natalensis*, *Bulinus* (*Bulinus*) *forskalii*, *Gyraulus* sp., *Segmentina* sp. and very numerous *Lymnaea natalensis*. *B. (B.) forskalii* was placed under laboratory observation and was not seen to emit furcocercariae.

N. Jones



- 1395**—PERLOWAGORA-SZUMLEWICZ, A., 1958. [Instituto Nacional de Endemias Rurais, Núcleo Central de Pesquisa, do DNERu, Brazil.] "Studies on the biology of *Australorbis glabratus*, schistosome-bearing Brazilian snail." *Revista Brasileira de Malariologia e Doenças Tropicais*, 10 (4), 459–529. [Portuguese summary pp. 489–492.]

Perlowagora-Szumlewicz describes the results of experiments designed to investigate the factors affecting the length of the life-cycle and fecundity in the Brazilian snail *Australorbis glabratus*. She has shown that size is a more important criterion of maturity than age, that the average length of the life-cycle is 53 days, the pre-oviposition period averages 44 days but varies from 26.9 to 82.7 and the incubation of the eggs takes from 7 to 15 days depending on the temperature. The mean number of eggs per mass rises gradually in the first few months of maturity and reaches a final value which varies from population to population. Reproduction is improved by the presence of vegetation and a single isolated snail can give rise to 100 individuals in two months and nearly 700 after six months.

C. A. Wright

- 1396**—ROWAN, W. B., 1959. [Department of Biology, Middlebury College, Middlebury, Vermont, U.S.A.] "Seasonal effect of heavy rains on the population density of *Australorbis glabratus* in a Puerto Rican watershed." *American Journal of Tropical Medicine and Hygiene*, 8 (5), 570–574.

Rowan has carried out observations on the effects of flooding on population density of *Australorbis glabratus* in a section of a river system in Puerto Rico. The observations extended over a period of 17 months during which there were five or six major floods and a number of minor ones. The major floods reduced the snail population severely but in every case there was a rapid recovery. The author attributes this to repopulation from a number of permanent breeding foci on seepage areas in the head-waters of the stream system which were largely unaffected by the floods.

C. A. Wright

- 1397**—STEFANŃSKI, W., 1959. [Zakład Parazytologii PAN, Warszawa, Poland.] "Występowanie i ekologia *Galba truncatula* w Polsce." *Wiadomości Parazytologiczne*, 5 (4/5), 327–331. [Also in English pp. 331–334.]

Stefański summarizes the results of investigations in 601 localities, concerning the distribution and ecology of *Galba truncatula* in Poland.

N. Jones

- 1398**—VERMEIL, C., 1957. "Etat actuel des recherches schistosomo-malacologiques en Tunisie—données expérimentales." *Archives de l'Institut Pasteur de Tunis*, 34 (4), 525–529.

17.5% of 40 *Bulinus truncatus* were experimentally infected using *Schistosoma haematobium* eggs originating from the same region as the molluscs. The incidence of infection was 5% in *B. truncatus* subjected to similar experimental conditions but coming from another region. An attempt to infect 40 *Planorbis marmoratus* with *S. haematobium* failed. Similar experiments were repeated with both snail species kept separately, kept together, and with a modification consisting in changing the water before introducing *S. haematobium* eggs: in these experiments all *B. truncatus* came from the same region as the carrier of the infection who supplied the schistosome eggs, whereas *P. marmoratus* came from a different region (the same as the *B. truncatus* in the second experiment). The results showed that the incidence of infection in *B. truncatus* was higher than in the three preceding experiments but no infection was detected in *P. marmoratus*. Thus it was shown that susceptibility to *S. haematobium* infection was not conferred on *P. marmoratus* by cohabiting with *B. truncatus*.

N. Jones

- 1399**—WAGNER, E. D. & MOORE, B., 1959. [Department of Microbiology, College of Medical Evangelists, Loma Linda, California, U.S.A.] "The development of *Schistosoma mansoni* in snails kept at certain constant temperatures." *Transactions of the American Microscopical Society*, 78 (4), 424–428.

Wagner & Moore report the results of a study on the effects of temperature on the development of *Schistosoma mansoni* in *Australorbis glabratus*. They found that a temperature of 26°–28°C. was the optimum for cercarial development and that the pre-patent period varied from 31 to 33 days at 24°C. to 20 days at 28.5°C. and that above this temperature the period increased. Mortality amongst the snails was highest in those kept at the higher temperatures.

C. A. Wright

## Control

See also Nos.: 1070, 1122, 1169, 1225, 1385.

- 1400**—GORDON, H. McL., PEARSON, I. G., THOMSON, B. J. & BORAY, J. C., 1959. [McMaster Animal Health Laboratory, Division of Animal Health & Production, C.S.I.R.O., Parramatta Road, Glebe, N.S.W., Australia.] "Copper pentachlorophenate as a molluscicide for the control of fascioliasis." *Australian Veterinary Journal*, **35** (11), 465-473.

A series of field trials is described in which copper pentachlorophenate was tested as a molluscicide against *Lymnaea launcestonensis* (the intermediate host of *Fasciola hepatica* in Australia). The compound was applied by dusting and spraying. It was most effective when used as a high volume spray at 10 lb. in 400 gal. of water per acre, applied from a boom spray carried by two men. The pumping and spraying equipment is described and illustrated, including a special lance designed to inject the molluscicide deep into soft muddy springs. The method of application is described. Preliminary preparation of snail habitats by survey and marking, by drainage and by removal or destruction of vegetation was essential. Spraying should be carried out before the end of winter, to precede the chief breeding season of the snails, and when there is plenty of water in the habitats. In comparative trials copper pentachlorophenate was more effective than copper sulphate. Sheep were dosed with 4 gm. copper pentachlorophenate without toxic effects, but it is pointed out that it is undesirable to add more copper to soils where chronic copper poisoning occurs in sheep. Other molluscicides may be used for these areas.

H. McL. Gordon

- \*1401**—KU, C. H. ET AL., 1957. [Field studies on eradication of snails in swamps by burial with earth.] *Chinese Journal of Hygiene*, **5** (5), 307. [In Chinese.]

- 1402**—LATIF, N. & FATHY, I., 1959. [Organic Chemistry Department, National Research Centre, Dokki, Cairo, Egypt.] "Carbonyl and thiocarbonyl compounds. Ia. Reaction of 9-diazoxanthene with *o*-quinones. b. The direct preparation of halogenated cyclic ethers from certain thiones and their molluscicidal activity." *Canadian Journal of Chemistry*, **37** (5), 863-868.

Latif & Fathy describe the preparation of halogenated cyclic ethers from certain thiones. The molluscicidal activity of a number of these compounds was tested using *Biomphalaria boissyi*. One of the compounds (IX) was found to kill snails at a concentration of 20 p.p.m. during a 24-hour exposure. Four of the compounds could not be tested because of their low solubility.

C. A. Wright

- \*1403**—LIU, S. H., 1957. [Residual density of snails after burial with earth.] *Chinese Journal of Hygiene*, **5** (5), 306. [In Chinese.]

- \*1404**—LIU, S. H., 1957. [Eradication of snails in swamps by burning.] *Chinese Journal of Hygiene*, **5** (5), 307-308. [In Chinese.]

- 1405**—LOBATO PARAENSE, W. & PEREIRA, O., 1957. "Resultados da aplicação do pentaclorofenol como planorbicida em uma área experimental." *Revista do Serviço Especial de Saúde Pública. Rio de Janeiro*, **9** (2), 179-186. [English summary p. 186.]

Paraense & Pereira present the results of a field trial of the molluscicide sodium pentachlorophenate in an area of the State of Minas Gerais, Brazil. The experimental area contained three streams and the associated bodies of water. One stream was treated completely from its source downwards but the other two were treated only in part. In the flowing waters a continuous flow apparatus was used for periods of 48 hours, while the static habitats were sprayed with a pump. A final dilution of 10 to 15 p.p.m. was used in both cases. Subsequent examination of the areas was carried out at 15-day intervals and habitats which were found to be positive were treated again. After four months the stream which was completely treated was free of snails and remained so for the duration of the experiment (25 months). This led the authors to believe that reinvasion of a habitat by up-stream migration is not a common occurrence. The general conclusion reached is that although sodium pentachlorophenate kills snails with which it comes into contact it lacks sufficient residual activity to deal with individuals which escape a single dose and repeated applications are therefore needed, which are likely to prove too expensive in both materials and labour.

C. A. Wright



**1406**—PAULINI, E., 1958. [Centro de Pesquisas de Belo Horizonte, Brazil.] "Revisão do estado atual do combate à esquistossomose pela aplicação de moluscicidas." **Revista Brasileira de Malariologia e Doenças Tropicais**, 10 (4), 341-353. [English summary pp. 349-350.]  
[This is a translation of a paper published in 1958 in **Bull. World Hlth Org.**, 18, 975-988. For abstract see **Helm. Abs.**, 27, No. 103m.]

**1407**—PAULINI, E., 1959. [Jefe, Laboratorio Químico, Centro de Belo Horizonte, Instituto Nacional de Endemias Rurais, Belo Horizonte, Brasil.] "El control de la bilharziasis mediante la aplicación de moluscocidas. Examen de su estado actual." **Boletín de la Oficina Sanitaria Panamericana**, 46 (4), 347-355.  
[This is a translation of a paper published in 1958 in **Bull. World Hlth Org.**, 18, 975-988. For abstract see **Helm. Abs.**, 27, No. 103m.]

**1408**—PESSÔA, S. B. & AMORIM, J. P., 1957. "Notas de campo sobre moluscocidas." **Revista Brasileira de Medicina**, 14 (8), 552-556. [English summary pp. 555-556.]  
Pessôa & Amorim describe experiments in which cheap and readily available molluscicides were used in attempts to eradicate the snail intermediate hosts of *Schistosoma mansoni* from pools near to living places in north-east Brazil. Good results were obtained with a mixture of six parts of pitch and four parts of gammexane dissolved in two parts of kerosene. The mixture was dispersed in sand and applied to give a concentration of about 30 gm. of pitch to the square metre of water surface. It was considered that treatment with this mixture might render the habitat permanently unsuitable for colonization by snails. The authors advocate the use of copper carbonate in open wells used as cattle drinking places. They also suggest that crude petroleum may prove to be another cheap molluscicide. C. A. Wright

### Miscellaneous

See Nos.: 1473, 1475, 1476, 1481, 1510.

## GENERAL HELMINTHOLOGY

### Technique

See also Nos.: 1012, 1097, 1196, 1448, 1511, 1544, 1567.

**1409**—ARNAU MACIAS, L., 1957. [WHO Laboratory, Seychelles.] "A new method of detecting parasitic organisms in drinking water." **Bulletin of the World Health Organization**, 17 (3), 496-497.

A technique for detecting parasitic organisms in water is described. It consists of: (i) filtering water under pressure through an asbestos disc filter; (ii) disintegrating the filter discs in 60 ml. of sterile water; (iii) filtering the residue so obtained through fine gauze; (iv) centrifuging the filtrate at 1,000 r.p.m. in 15 ml. tubes; (v) concentrating samples of the sediment by Faust's technique or with Artigas' modification. In this way the author found *Strongyloides stercoralis* larvae and *Hymenolepis diminuta* eggs. N. Jones

**1410**—BECKWITH, N. C., 1957. [1837 Broadway, South Portland, Maine, U.S.A.] "Five parasites infecting man and methods for their identification." **American Journal of Medical Technology**, 23 (6), 366-368.

The parasites dealt with are: *Ascaris lumbricoides*, *Diphyllobothrium latum*, *Trichinella spiralis* and two protozoan species. J. M. Watson

**1411**—BUONOMINI, G. & RICCIARDI, M. L., 1957. [Istituto di Igiene e Microbiologia dell'Università di Pisa, Centro per la Lotta Contro le Parassitosi Intestinali.] "Di un utile e semplice metodo per la ricerca di cisti di protozoi e uova di elminti nei liquami di fogna." **Annali della Sanità Pubblica**, 18 (4), 967-968.

A technique for finding helminth eggs in sewage waters is described. It consists of: (i) sedimentation of one litre of the fluid in an Imhoff cone for about 24 hours; (ii) suspension of the

sediment in spring water and centrifuging in conical tubes of 15 c.c. capacity at 2,000 r.p.m. for two minutes (repeated if the supernatant fluid has a turbid appearance); (iii) re-suspension of the sediment in about 7 c.c. of spring water and vigorous shaking with 2 c.c. to 3 c.c. of ether; (iv) centrifuging again at 2,000 r.p.m. for two minutes; and (v) examination of the sediment after decanting the first three layers.

N. Jones

**1412**—BURCH, G. R., 1959. [Pitman-Moore Veterinary Clinical Research Department, New Augusta, Ind., U.S.A.] "Sheep drenching technique." **Journal of the American Veterinary Medical Association**, **135** (12), 622-623.

Burch administered a dyed 15% suspension of diphenanthene-70 to nine lambs, to compare three different drenching techniques. He found that the lambs drenched by the slow or rapid oral techniques, and killed soon after, had the suspension in the abomasum; while those given the drench by means of an oesophageal tube had the suspension in the reticulum but not in the abomasum. These results were obtained without the prior use of copper sulphate to close the oesophageal groove.

C. Hatch

**1413**—CAIRNS, E. J., 1957. [Alabama Polytechnic Institute and Agric. Exper. Station, Auburn, Alabama.] "Specialized microscopy for the study of nematodes." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 16 pp.

Cairns describes the operation of and discusses the advantages and disadvantages in using the following types of microscope for nematode study: electron, X-ray, phase contrast, interference contrast and fluorescent microscopes. Two types of reflection objectives are described and their uses in nematology discussed.

D. J. Hooper

**\*1414**—CHANG, P. T., 1957. [Culture of *Oncomelania hupensis* in the laboratory in North China.] **Acta Microbiologica Sinica**, **5** (3), 313-318. [In Chinese.]

**1415**—EDESON, J. F. B., 1959. [Institute for Medical Research, Kuala Lumpur, Federation of Malaya.] "Studies on filariasis in Malaya: the accuracy of blood surveys." **Annals of Tropical Medicine and Parasitology**, **53** (4), 388-393.

The numbers of microfilariae found by examining 20 to 80 cu.mm. of blood from persons harbouring few microfilariae are given; when only 20 cu.mm. of blood are examined, the number of microfilaria carriers is under-estimated.

W. A. F. Webber

**1416**—HOBSON, H. P., 1959. [Carrollton, Ill., U.S.A.] "Angiocardiography in canine dirofilariasis 1. Preliminary studies." **Journal of the American Veterinary Medical Association**, **135** (11), 537-544.

15 dogs positive for *Dirofilaria immitis* microfilariae were anaesthetized and intravenously injected with 0.5 to 1.0 ml. of 70% sodium acetrizoate contrast medium. After eight seconds a left lateral angiocardiogram was taken and the resultant picture compared with the number of heartworms removed surgically or found on necropsy. Whilst some impairment of the circulation of infected dogs is demonstrated by the technique, Hobson considers that the location of the parasites governs its use in diagnosis, as impairment was greatest when parasites were in the pulmonary arteries.

N. A. Hancock

**\*1417**—HSÜ, L. Y. & LANG, C. C., 1958. [Evaluation of cholangiography in diagnosis of biliary ascariasis lithiasis.] **Chinese Journal of Radiology**, **6** (6), 415-420. [In Chinese.]

**1418**—JONES, F. G. W., 1957. [Rothamsted Experimental Station, Harpenden, Herts, U.K.] "Principles of population measurement." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 11 pp.

[This article is substantially the same as that in Soil Zoology, Proceedings of the University of Nottingham Second Easter School in Agricultural Science, 1955, edited by D. K. McE. Kevan, London: Butterworths Scientific Publications, pp. 394-401. For abstract see Helm. Abs., **24**, No. 4751.]



- 1419**—LEWIS, D. J., 1960. "Some methods for the study of *Simulium damnosum*, and a planidium in an ovary of a female." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **54** (1), 10.

A method of removing, undamaged, a peritrophic membrane full of blood from *Simulium damnosum* so that microfilariae of *Onchocerca volvulus* in it can be counted, was demonstrated. The head of a female fly was shown, with nematodes emerging from it, probably *O. volvulus*. A planidium larva within the ovary of a fly from the River Lofa in Southern Cameroons was shown; such larvae of Hymenoptera are often found on the surface of *S. damnosum*.

N. A. Hancock

- \*1420**—LIEN, S. H., 1958. [Roentgen diagnosis of biliary ascariasis.] **Chinese Journal of Radiology**, **6** (6), 403–414. [In Chinese.]

- \*1421**—LIU, T. S., WU, Y. M. & FANG, T. T., 1959. [Diagnostic methods for acute schistosomiasis japonica in patients and experimental animals.] **Chinese Journal of Internal Medicine**, **7** (3), 232–235. [In Chinese: English summary pp. 20–21.]

Various diagnostic methods were tested on 67 acute cases of schistosomiasis japonica. Circum-oval precipitation reaction and cercarial membrane reaction gave much higher positive results than rectal biopsy for ova and intradermal antigen test. These results were confirmed on 25 experimentally infected rabbits. In the first method of diagnosis, the degree of positive reaction corresponded to the severity of infection. [Taken from an abstract in **Chin. med. J. Peking**, **78** (4), 385.]

N. A. Hancock

- 1422**—SEINHORST, J. W., 1957. "Breeding for resistance to *Ditylenchus*." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1–6, 1957, 7 pp.

Seinhorst describes methods used in breeding for resistance to *Ditylenchus dipsaci* with rye, red clover and lucerne. Laboratory techniques using filter paper strips and thick filter pads for clover and rye seedlings respectively are described. Selection in the field for all three crops is also discussed. Large numbers of *D. dipsaci* for inoculating rye seedlings are obtained by inoculating potato tubers which are then stored at room temperature for about six months. In completely resistant plants *D. dipsaci* seem unable to dissolve the middle lamellae of the plant cells.

D. J. Hooper

- 1423**—SILVA JUNIOR, M., 1957. [Cat. de Higiene da Fac. Nac. de Farmácia da Un. do Brasil.] "Novo método de exame parasitológico das fezes: o 'detector larvoocyst'." **Revista Brasileira de Medicina**, **14** (8), 545–550. [English summary p. 550.]

Silva Junior describes a modification of Faust's method for concentrating helminth eggs, larvae and protozoal cysts from faecal samples. The technique depends upon the concentration of the meniscus in a zinc sulphate flotation by means of an open bottomed cylinder with a constriction at the upper end. This is placed in the container in which the flotation is carried out before it is centrifuged for the second time. All of the stages in the process are fully illustrated.

C. A. Wright

- 1424**—SMITHERS, S. R., 1960. [National Institute for Medical Research, Mill Hill, Middlesex, U.K.] "The isolation of viable schistosome eggs by a digestion technique." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **54** (1), 68–70.

The livers and small intestines of hamsters infected with *Schistosoma mansoni* were washed, chopped up and digested with trypsin, followed by pepsin after incubation and further washing. The remaining deposit was washed in saline by centrifuging in a controlled method so that the supernatant contained mainly dead eggs and debris. The sediment of mainly viable eggs was tested and these were found to hatch readily in fresh water. *Australorbis glabratus* was successfully infected and a positive circum-oval precipitin test was carried out with eggs from this method.

N. A. Hancock

- 1425**—SUESSENGUTH, H., BAUER, A. H. & GREENLEE, A. M., 1957. [Mt. Sinai Hospital, Cleveland, Ohio, U.S.A.] "Evaluation of the Suessenguth-Kline test for trichinosis." **Public Health Reports. Washington**, **72** (10), 939–942.

When evaluated for public health and diagnostic laboratory purposes, the Suessenguth-Kline flocculation slide test for trichinelliasis [for abstracts of description and improved technique

see Helm. Abs., **13**, No. 323a and **16**, No. 380b] proved simple in performance, reproducible, specific and more sensitive than the complement fixation test. The reproducibility was illustrated by a 97.1% complete agreement and 1.1% partial agreement of duplicate tests performed on 1,216 serum specimens at two laboratories. The sensitivity and specificity was proved in an analysis of 62 cases; of 27 positive test results, in 25 the diagnosis was trichineliasis and in one it was inconclusive and of 35 negative test results none were diagnosed as trichinelliasis.

G. I. Pozniak

**1426**—TAYLOR, J. C., KINCAID, C. M. & THRELKELD, W. L. [Virginia Agricultural Experiment Station, U.S.A.] "The influence of volume of feed intake on the precision of estimates of internal parasite eggs in the feces of beef cattle." [Abstract.] **Proceedings of the Association of Southern Agricultural Workers**, 54th Annual Convention (1957), p. 94.

Experiments involving 10 cattle, showed that internal parasite egg counts were significantly higher in cases of restricted feeding than in those of non-restricted feeding. Counts were highest in faecal samples taken in the morning. There was no difference between noon and evening samplings.

N. Jones

**1427**—VEGTE, F. A. VAN DER, 1959. [Division of Entomology, Section Nematology, Pretoria, South Africa.] "A method for fixing and mounting nematodes in one process." **Nematologica**, **4** (4), 356-357.

For fixing and mounting nematodes in one process van der Vegte uses the following mixture which is named "Arfagal": gum arabic (acacia) tears 50 gm., distilled water 100 c.c., 40% formalin 40 c.c., 96% alcohol 50 c.c., and glacial acetic acid 3 c.c. Living nematodes are put into a drop of this mixture on a slide which is heated until vapour is observed. The nematodes are then transferred to a fresh drop of the mixture, covered with a warm coverslip, and later sealed if required. Stains can be added to the mixture. Mounts made in 1956 by this method are still in excellent condition.

D. J. Hooper

**1428**—VERCRUYSE, R. & DERDE, E., 1959. [Laboratorium voor Parasitologie van de Rijksveeartsenijschool te Gent.] "Onderzoek naar de verspreiding van de leverbot bij het rund in Oost- en West-Vlaanderen." **Vlaams Diergeneeskundig Tijdschrift**, **28** (6), 170-176. [English, French & German summaries p. 176.]

The writers describe a technique, attributed to Wetzel & Urbach, for the concentration of trematode eggs in bovine faeces to be used in mass surveys. They report the findings in a survey of the incidence of *Fasciola hepatica* in cattle in West and East Flanders. After the faeces have been passed through sieves of different mesh for the removal of rough particles they are sedimented repeatedly. Finally the sediment is mixed with saturated solutions of zinc chloride and sodium chloride, centrifuged for a short period and a little of the solution is then added to raise the meniscus in which the eggs are concentrated so as to make it possible to remove a drop by the application of a glass slide. A controlled experiment with known quantities of eggs showed that two applications of a slide to the meniscus removed 83.9% of the eggs; five removed 93%. For practical survey purposes two applications were adopted as a routine. The shape of the eggs is distorted by the saturated solutions but practice is said to enable one to recognize them. 2,000 faecal examinations of cattle in East and West Flanders revealed an infection of more than one-third of all animals on more than two-thirds of the farms checked in the former province and respective figures of 15.6% and 36.8% in the latter. Tables giving the incidence in different age groups and parishes are included.

W. M. Fitzsimmons

**1429**—WAGNER, E. D. & WONG CHI, L., 1959. [Department of Microbiology, College of Medical Evangelists, Loma Linda, California, U.S.A.] "Methods on the rearing of the snail, *Oncomelania* spp." **Transactions of the American Microscopical Society**, **78** (4), 421-423.

Wagner & Wong Chi describe the conditions which they have found to be most satisfactory for the rearing of snails of the genus *Oncomelania* in the laboratory. The snails are kept in 5 in. clay saucers, one and a half inches deep and glazed only on the outside, covered by glass plates with a gauze-covered hole in the centre. A soil, sand and pebble mixture is sloped on



one side of the dish which is then one third filled with water. Filter paper is used to supplement the algal growth in the dishes as food. The optimum temperature is 26°C. and continuous light from a 40-Watt daylight-type fluorescent tube placed 15 in. above the container was found to give the best results.

C. A. Wright

### Geographical Distribution

See also Nos.: 1049, 1082, 1084, 1088, 1108, 1142, 1149, 1154, 1157, 1181, 1237, 1238, 1239, 1245, 1249, 1250, 1251, 1252, 1253, 1254, 1255, 1256, 1257, 1258, 1287, 1329, 1381, 1386, 1445; Medical Helminthology—Surveys; Taxonomy—all sections.

**1430**—BOGDANOV, O. P., MARKOV, G. S. & FEDOROV, M., 1957. [A systematic survey of worms parasitic in some Central Asiatic Sauria.] *Izvestiya Akademii Nauk Uzbekskoi SSR. Seriya Biologicheskaya*, No. 2, pp. 65–71. [In Russian.]

Twenty-one species of helminths are listed for ten species of Sauria from Central Asia. *Thelandros alatus*, *T. maplestoni*, *Abbreviata sonsinoi* and *Thubunaea baylisi* are reported for the first time from the U.S.S.R. and about ten new host records are made [only the common Russian names of the hosts are given]. The helminth fauna is also considered in relation to the ecology of the hosts.

G. I. Pozniak

**1431**—DOBBIN, Jr., J. E., 1957. [Faculdade de Medicina da Universidade do Recife e do Centro de Pesquisas Aggeu Magalhães, Brazil.] “Fauna helmintológica de batráquios de Pernambuco, Brasil. I. Trematoda.” *Anais da Sociedade de Biologia de Pernambuco*, 15 (1), 23–61. [English summary p. 36.]

Dobbin describes the trematode fauna of frogs and toads from Pernambuco, Brazil. He reports *Glypthelmins linguatula* (Rudolphi, 1819) Travassos, 1924 from the small intestine of *Leptodactylus pentadactylus labyrinthicus* Spix; *G. palmipedis* (Lutz, 1928) Travassos, 1930 from the small intestine and, rarely, the stomach of *L. ocellatus* (L.), also from the small intestines of *L. p. labyrinthicus* and *Rana palmipes* Spix; *Choledocystus elegans* (Travassos, 1928) Ruiz, 1949 from the gall-bladders of *L. p. labyrinthicus*, *L. ocellatus* and *Bufo marinus bimaculatus* Wied.; *Haematoloechus iturbei* (Cordero & Vogelsang, 1939) Walton, 1949 from the lungs of *R. palmipes*; *Gorgoderina parvicava* Travassos, 1922 from the urinary bladder of *L. ocellatus* & *L. p. labyrinthicus*; *G. rochalimai* Pereira & Cuocolo from the bladders of *B. arenarius* and *L. ocellatus*; and finally, *Catadiscus propinquus* Freitas & Dobbin Jr., 1956 from the large intestine of *R. palmipes*. All of the species recorded are described and figured and a key to the species of the genus *Catadiscus* Cohn, 1904 is provided.

C. A. Wright

**1432**—GAGARIN, V. G., STESHENKO, V. M. & TOKOBAEV, M. M., 1957. [The role of rodents in the distribution of helminthic zoonoses.] *Trudi Instituta Zoologii i Parazitologii. Akademiya Nauk Kirgizskoi SSR.*, Year 1957, No. 6, pp. 159–160. [In Russian.]

Gagarin *et al.* briefly discuss the role of rodents in the distribution of echinococcosis and *Hepaticola hepatica* infection in Kirgizia. The latter was found for the first time in Kirgizia in 1956.

N. Jones

**1433**—MACKERRAS, M. J., 1958. [Queensland Institute of Medical Research, Brisbane, Australia.] “Catalogue of Australian mammals and their recorded internal parasites. I–IV. Part I. Monotremes and marsupials.” *Proceedings of the Linnean Society of New South Wales*, 83 (2), 101–125.

This part contains the names of three monotremes and 158 marsupials. Parasites have been recorded from all the monotremes and from 72 marsupials. They have been found in representatives of all the families except the Notoryctidae, which may not have been examined. Two trematodes are known from the platypus and five from polyprotodont marsupials. No trematodes have been recorded from diprotodonts except, occasionally, *Fasciola hepatica* (an introduced parasite). Two adult cestodes are known from echidnas, five from polyprotodonts, and 21 from diprotodonts. The majority of the cestodes belong to the Anoplocephalidae. Hydatids (introduced) occur in wallabies and kangaroos. Nematodes are known from an echidna and from 55 marsupials. Of about 156 described species nearly 80% belong

to the Strongyloidea. No unequivocal record of an adult member of the Ascaridoidea has been made. One species of *Acanthocephala* occurs in bandicoots. In the concise summary of the history of the subject the author draws attention to the large gaps in our knowledge which still remain. The names of the very numerous species from which no parasites have been recorded are published in the hope that zoologists will not lose opportunities of collecting the valuable material from them. An exhaustive bibliography follows the check-list.

W. M. Fitzsimmons

- 1434**—MACKERRAS, M. J., 1958. [Queensland Institute of Medical Research, Brisbane, Australia.] "Catalogue of Australian mammals and their recorded internal parasites. I-IV. Part II. Eutheria." *Proceedings of the Linnean Society of New South Wales*, **83** (2), 126-143.

This part contains the names of 171 animals, eight of them (rabbit, hare, brown and black rats, mouse, dog, cat and fox) introduced by man. The parasites of the introduced animals are the same as those they harbour in other parts of the world. Relatively few records have been found for the indigenous Eutheria. This appears to be due to a lack of examinations rather than any deficiency in the parasite fauna. There are 85 native rats belonging to 17 genera; helminths have been recorded from eight species belonging to four genera. There are 57 bats (49 native) belonging to 24 genera; helminths have been recorded from seven species belonging to five genera. Extra-territorial records from the dugong are included, and also from some bats, because the Australian representatives of these wide-ranging mammals may be hosts to the same or related parasites. Records from some Antarctic and sub-Antarctic mammals are included. Trematodes are known from a water-rat (three species), small bats (several undescribed species), the dugong (ten species), and a seal (one species). Cestodes are known from some rats and bats, and are common in carnivorous marine mammals. Nematodes occur in all groups. *Acanthocephala* are recorded from two native rats and several marine animals. An exhaustive bibliography is given.

W. M. Fitzsimmons

- 1435**—MACKERRAS, M. J., 1958. [Queensland Institute of Medical Research, Brisbane, Australia.] "Catalogue of Australian mammals and their recorded internal parasites. I-IV. Part III. Introduced Herbivora and the domestic pig." *Proceedings of the Linnean Society of New South Wales*, **83** (2), 143-153.

In this part the author gives the names of 11 introduced mammals: pig, dromedary, ox, sheep, goat, horse, donkey, mule, zebu, water-buffalo and red deer. There are no records of parasites from the last-mentioned five. Only four species of trematodes have become established, namely, the liver-fluke and three flukes inhabiting the rumen of sheep and cattle. Three species of adult cestodes occur in the horse, and four in ruminants. Hydatids have been recorded from sheep, cattle, goats, pigs, horses and camels. Larval stages of other dog tape-worms occur in sheep, cattle, goats and pigs. Numerous species of nematodes are present in stock, most important being species of *Trichostrongylidae* in sheep and cattle, and of *Strongylidae* in the horse. One *acanthocephalan* is known from the pig. A long bibliography is attached to this paper.

W. M. Fitzsimmons

- 1436**—MACKERRAS, M. J., 1958. [Queensland Institute of Medical Research, Brisbane, Australia.] "Catalogue of Australian mammals and their recorded internal parasites. I-IV. Part IV. Man." *Proceedings of the Linnean Society of New South Wales*, **83** (2), 153-160.

*Fasciola hepatica*, *Clonorchis sinensis*, *Schistosoma haematobium*, *S. mansoni*, *S. japonicum*, *Taenia solium*, *T. saginata*, *Echinococcus granulosus* [as hydatid cyst], *Hymenolepis diminuta*, *H. nana*, *Dipylidium caninum*, *Raillietina* (*Raillietina*) *celebensis*, *Diphyllobothrium latum*, *Sparganum* spp., *Strongyloides stercoralis*, *Trichuris trichiura*, *Trichinella spiralis*, *Trichostrongylus colubriformis*, *T. axei*, *Haemonchus contortus*, *Ancylostoma duodenale*, *Necator americanus*, *Enterobius vermicularis*, *Ascaris lumbricoides*, *Wuchereria bancrofti*, *Loa loa* and *Dracunculus medinensis* have been recorded as true or accidental parasites in man in Australia. *E. granulosus* is considered to be the most dangerous animal parasite of the white population in South Australia, and hookworms of the native populations in the north. In addition, schistosome dermatitis, creeping eruption and visceral larva migrans are caused by parasites of other animals. Filariasis and ancylostomiasis are on the decrease throughout the population as a



whole, but the latter is still widely disseminated among the aborigines of Queensland and the Northern Territory. Human schistosomiasis is negligible and there have been no notifications since the last war. A long list of references is given.

W. M. Fitzsimmons

**1437**—PROKOPIČ, J., 1957. [Biologický ústav ČSAV, parazitologie, Praha.] "Helmintofauna rejskovitých (Soricidae) Vysokých Tater." *Zoologické a Entomologické Listy*, 6 (2), 147–154. [English & Russian summaries p. 154.]

Prokopič examined a total of 65 specimens of *Sorex araneus*, *S. minutus*, *S. alpinus taticus*, *Neomys fodiens* and *N. anomalus* from the high Tatry mountains. Altogether 24 helminth species were found representing Brachylaemidae, Plagiorchiidae, Lecithodendriidae, Hymenolepididae, Dilepididae, Physalopteridae, Heligmosomatidae, Capillariidae and Strongyloidea. *Opisthioglyphe megastomus*, *Cephalotrema minutum* and *Staphylocystis alpestris* are known only from the Tatry mountains and are considered to be exclusively high mountain species. Four other species have also been found in other mountain systems but the rest are known from the whole country irrespective of altitude. Tapeworms were the best represented group.

N. Jones

**1438**—PROKOPIČ, J., 1957. [Biologický ústav ČSAV, parazitologie, Praha.] "Příspěvek k helmintofauně bělozubek (Crocidae, Insectivora)." *Zoologické a Entomologické Listy*, 6 (2), 155–162. [English & Russian summaries p. 162.]

Prokopič examined 28 *Crocidae suaveolens* and four *C. leucodon* in 1954 and 1955. According to the text this is the first record of *Staphylocystis loosi* and *S. jacobsoni* from the European continent, the former having been found in both host species, the latter only in *C. suaveolens*. *S. furcata* (from *C. suaveolens*) and *Longistriata depressa* are recorded for the first time in Czechoslovakia. [It is stated in the summaries that this is the first record of *S. furcata* from the European continent, whereas according to the text it has been found in France.] This is also the first record of *L. depressa* and *S. jacobsoni* and *Schistometra conoides* larvae, which were also found, from *C. suaveolens*. Other helminths found were *Panopistus europaeus* and larvae of *Centrorhynchus buteonis*. The total incidence of infection was 78.12%.

N. Jones

**1439**—PROKOPIČ, J., 1957. [Biologický ústav, ČSAV, parazitologie, Praha.] "Systematické zpracování cizopasných červů krtka obecného a srovnání invaze cizopasných červů u jednotlivých rodů hmyzožravců na území ČSR." *Zoologické a Entomologické Listy*, 6 (4), 331–340. [English & Russian summaries p. 340.]

The incidence of helminth infection in 52 *Talpa europaea* examined in Czechoslovakia during 1954–56 was: *Ityogonimus talpae* 1.77%; *Skrjabinimerus petrowi* 5.77%; *Staphylocystis bacillaris* 17.3%; *Choanotaenia filamentosa* 7.7%; *Spirura talpae* 28.9%; *Morganiella talpae* 34.63%; *Capillaria talpae* 25%; *Parastrongyloides winchesi* 15.38%; and *Porrocaecum talpae* larvae 11.53%. The author goes on to discuss the comparative incidence of helminths in individual species of Insectivora in Czechoslovakia.

N. Jones

**1440**—RAUSCH, R., 1959. [Arctic Health Research Center, Public Health Service, U.S. Department of Health, Education and Welfare, Anchorage, Alaska.] "Studies on the helminth fauna of Alaska. XXXVI. Parasites of the wolverine, *Gulo gulo* L., with observations on the biology of *Taenia twitchelli* Schwartz, 1924." *Journal of Parasitology*, 45 (5), 465–484.

Rausch records six species of helminth from 69 of 80 wolverines examined from four localities in Alaska: (i) Cestoda—*Mesocostoides kirbyi* and *Taenia twitchelli*; (ii) Nematoda—*Trichinella spiralis*, *Molineus patens*, *Ascaris devosi* and *Physaloptera torquata*. One specimen of an apparently undescribed species of *Alaria* was recovered from a captive wolverine. *M. kirbyi*, *A. devosi*, *P. torquata* and *Alaria* sp. are recorded for the first time from the wolverine, and *M. patens* for the first time from this host in North America. Experimental feedings of the eggs of *T. twitchelli* to six rodent species produced multiscalex larvae. In five other rodent species and the Rhesus monkey, larval development was abnormal or severely inhibited. The development of, and host reactions to, larvae of *T. twitchelli* are described in detail. In the intermediate host, oncospheres enter the portal circulation, pass through the liver, and localize in the lungs. After several weeks, the majority of the larvae emigrate to the pleural cavities and become vesicular multiscalex forms. In one naturally infected porcupine, only uniscalex

larvae were found, which when fed to a wolverine produced ovigerous adults 66 days later. The original description of *T. twitchelli* is supplemented. Characteristics of the rostellar hooks serve to distinguish the adult *T. twitchelli* from both *T. mustelae* Gmelin, 1790 and *T. martis* (Zeder, 1803), the only other species of *Taenia* known from boreal mustelids. E. I. Sillman

- 1441—SWIERSTRA, D., JANSEN, Jr., J. & BROEK, E. VAN DEN, 1959. [Institute of Veterinary Parasitology & Parasitic Diseases of the State University at Utrecht, The Netherlands.] "Parasites of animals in the Netherlands. Survey of identified parasites of domestic and free-living animals and fecal examinations in the years 1948–1958 inclusive." *Tijdschrift voor Diergeneeskunde*, 84 (16), 892–900. [French, German & Dutch summaries p. 900.]

This list of parasites from wild, domestic and laboratory animals in the Netherlands supplements previous lists for earlier years. Parasites are listed under their hosts. The following are new host records: for cattle, *Ostertagia leptospicularis* and *Grosspiculagia lasensis*; for sheep, *O. leptospicularis* and *G. lasensis*; for *Pavo cristatus*, *Capillaria phasianina*; for *Ovis musimon*, *Trichostrongylus axei*; for *Cervus elaphus*, *T. colubriformis* and *Cooperia pectinata*; for *Capreolus capreolus*, *Trichostrongylus longispicularis*; for *Dama dama*, *T. vitrinus* and *T. colubriformis*.  
A. E. Fountain

- 1442—SWIERSTRA, D., JANSEN, Jr., J. & BROEK, E. VAN DEN, 1959. [Institute of Veterinary Parasitology & Parasitic Diseases of the State University at Utrecht, The Netherlands.] "Parasites of zoo-animals in the Netherlands. Survey of parasites of zoo-animals and animals not endemic in the Netherlands, identified from 1948 to 1958 inclusive." *Tijdschrift voor Diergeneeskunde*, 84 (22), 1301–1305. [French, German & Dutch summaries p. 1305.]

The parasites recorded in this list for captive wild animals in the Netherlands are nearly all from the zoological gardens at Rotterdam and Amsterdam. The following are new host records: *Trichostrongylus axei* from *Ovis ammon*; *T. probolurus* from *Giraffa camelopardalis*; *T. colubriformis* and *Haemonchus contortus* from *Ovis musimon*.  
A. E. Fountain

### Cytology and Genetics

See also Nos.: 1256, 1278, 1299, 1479.

- 1443—PAHL, G. & BACHOFER, C. S., 1957. [St. Mary's College, Winona, Minnesota, U.S.A.] "Anaerobic recovery of *Ascaris* eggs from X-irradiation." *Biological Bulletin*, 112 (3), 383–389. Pahl & Bachofer describe experiments showing that X-irradiation of *Ascaris suum* eggs produces delay of cell cleavage and reduces the percentage of eggs that complete embryogenesis; that anaerobic treatment of eggs after irradiation followed by aerobic incubation reduces the time required for cleavage and increases the percentage that completes embryogenesis; and that post-irradiation treatment with cyanide produces recovery effects similar to those secured with anaerobiosis. A cytochrome system in the eggs was demonstrated. The significance of these results is discussed.  
J. M. Watson

- 1444—ROTHACKER, D. & STELTER, H., 1957. [Institut für Pflanzenzüchtung Gross-Lüsewitz der Deutschen Akademie der Landwirtschaftswissenschaften, Berlin, Germany.] "Beiträge zur Resistenzzüchtung gegen den Kartoffelnematoden (*Heterodera rostochiensis* Wollenweber). II. Untersuchungen über die Vererbung der Nematodenresistenz bei den Arten *S. vernei* Bitt. et Wittm. und *S. tuberosum* L. subspecies *andigena* (Buk.) Hawkes." *Züchter*, 27 (7), 341–350. Rothacker & Stelter investigated the nature of resistance to *Heterodera rostochiensis* in four lines of *Solanum vernei* and three of *S. tuberosum* subsp. *andigena*. Their findings are in agreement with those of Toxopeus & Huijsman [for abstract see Helm. Abs., 22, No. 535a] that resistance in *andigena* may be due to a single dominant gene. Direct crossing of *vernei* with cultivated potatoes is difficult, due to difference in chromosome number, but artificially induced polyploids of *vernei* may be crossed readily with our cultivated varieties. The resistance found in *vernei* appears to be of a different nature from that of *andigena* and is probably polygenic.  
R. D. Winslow



## Morphology, Anatomy and Histology

See also Nos.: 1154, 1191, 1205, 1240, 1324, 1431, 1440, 1473, 1477; Taxonomy—all sections.

**1445**—ABLASOV, N. A., 1957. [The helminth fauna of aquatic birds in Kirgizia.] **Trudi Instituta Zoologii i Parazitologii. Akademiya Nauk Kirgizskoi SSR**, Year 1957, No. 6, pp. 121–144. [In Russian.]

On examining 426 wild and 77 domestic aquatic birds in Kirgizia during 1950–55, 24 trematode, 47 cestode, 21 nematode and two acanthocephalan species were found. The author completes, redescribes or gives variable diagnostic characteristics of some of those species. Thus a cavity was found, forming a sort of sheath around the acetabulum of *Psilochasmus longicirratus*, possibly connected with its new host (*Anas platyrhynchos*). *Microsomscanthus paramicrosoma* Gasowska, is considered as synonym of *M. microsoma* (Creplin) López-Neyra. Both types, namely type “V” and type “VI”, of arrangement of testes of *Sobolevicanthus fragilis* Krabbe were observed. The presence of a long chitinous stylet, protruding from the cirrus was also observed in this species as well as in *S. octacantha*. The presence of a chitinous cirrus, but no “muff” around it was found in *Sphenacanthus* (?) *andrejewoi* Matevosyan. This species is conditionally left by the author in the genus *Sphenacanthus*. *Hymenolepis longicirrata* Fuhrmann is left as a synonym of *S. fasciculata* López-Neyra. In the specimens of *Dicranotaenia coronula* examined it was observed that the internal Fuhrmann’s body, (sacculus accessorius interna, as different from s.a. externa) was not behind the cirrus canal (Skryabin & Matevosyan, 1945), but in front of it. It was also observed that the formation stages of the uterus in this species were the same as in anoplocephalids, (Spasski, 1951). *D. pseudocoronula* is made a synonym of *D. coronula* (Dujardin) Railliet. It is concluded that *Aploparaksis japonensis* Yamaguti, is a synonym of *A. furcigera* Rudolphi. Some of the specimens of *Lateriporus clerci* examined had 18 instead of 16 hooks. The back of the hooks was found to be slightly convex and not concave. Six small papillae were found symmetrically arranged around the opening of the buccal capsule of *Amidostomum spathulatum*. A description of a male of *Dispharynx* sp. is given. The paper contains a list of parasites found during the survey and their incidence in different host species. N. Jones

**1446**—ANDERSON, R. C., 1959. [Department of Parasitology, Ontario Research Foundation, Toronto 5, Ontario, Canada.] “The morphology of *Monopetalonema alcedinis* (Rudolphi, 1819) (Nematoda: Filarioidea) including its first-stage larva.” **Canadian Journal of Zoology**, **37** (5), 609–614.

Anderson redescribes *Monopetalonema alcedinis* from material collected from *Megaceryle a. alcyon* from Ontario, Canada. It is reported that the cephalic papillae are double, that the caudal alae on the male tail meet in front of the anus, that there is a median papilla in front of the anus and two pairs of post-anal structures (? phasmids and post-deirids), the body is covered by cuticular bosses, and the distal part of the left spicule is alate. The first-stage larva bears two cuticular ridges at the anterior end and the tail is blunt with many small spines, one group of which forms a circlet about the tail. *M. alcedinis* is compared with the other five species of the genus. W. G. Inglis

**1447**—EDESON, J. F. B., 1960. [Department of Parasitology and Entomology, Liverpool School of Tropical Medicine, Liverpool, U.K.] “The microfilariae of the periodic and semi-periodic forms of *Brugia malayi*.” [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **54** (1), 6.

Periodic microfilariae are mostly without a sheath, empty sheaths being found in the blood films, whilst semi-periodic ones are usually within a sheath and empty ones are very rarely seen. This difference is constant in Malaya. N. A. Hancock

**1448**—HOLZ, J. & PEZENBURG, E., 1957. [Parasitologisches Institut der Veterinärmedizinischen Fakultät der Freien Universität, Berlin-Dahlem, Bitterstr. 14–16.] “Histologie und histochemische Untersuchungen an den Hüllen von *Cysticercus inermis*.” **Monatshefte für Tierheilkunde**, **9**, 37–43.

The histological structure of the cyst wall of *Cysticercus inermis* from cattle is described in detail and illustrated by three photomicrographs. In a study of its chemical composition the following reactions gave positive results: (i) in the host layers—the Ciaccio I method for lipoids,

nile blue and a combination of Sudan III with Scharlach-R for fats, Schultze's reaction for cholesterol and the periodic acid-leucofuchsin reaction; and (ii) in the cyst wall proper—Best's test for glycogen, the Sudan III with Scharlach-R test for fats, the Turnbull blue reaction and the periodic acid-leucofuchsin reaction. G. I. Pozniak

- 1449—INAMURA, Y., 1959. [Department of Parasitology, Gifu Prefectural Medical School, Gifu.] [Studies on *Gnathostoma* (Nematoda). III. On the secretory and excretory systems of adult *G. spingillum*.] *Acta Scholae Medicinalis in Gifu*, 7 (3), 767-777. [In Japanese: English summary p. 767.]

A pair of lips was found as an oval-shaped projection, each equipped with three pairs of lateral papillae. Each papilla had one amphidial gland duct, with one nerve ending at each side of the opening. Four amphidial glands were found around the oesophagus. The cervical glands were huge and unicellular and located around the nerve ring; their ducts seemed to open to the oesophagus. The excretory system was not well developed and was H-shaped. The oesophageal glands were located behind the nerve ring, occupied the greater part of the oesophageal wall and discharged their secretions into the oesophageal lumen at the level of the nerve ring. Cephalic sac and cervical sac systems seemed to be derived from the cephalic glands. Y. Yamao

- 1450—ISHIKAWA, M., 1959. [Department of Anatomy, Faculty of Medicine, Nagoya University, Nagoya, Japan.] [On the muscle cells in *Ascaridia galli*.] *Japanese Journal of Parasitology*, 8 (4), 458-463. [In Japanese: English summary p. 463.]

In *Ascaridia galli*, proliferating ectoderm cells went down deep into the mesoglia and formed mesenchyme in six to eight days after hatching. 22 or 24 days after hatching muscle cells were formed from the mesenchyme. In *Ascaris* from the pig, muscle fibres were formed of myofibrils and, glycogen granules were noted between the muscle fibres. Lipid droplets were found in the peripheral part of muscle fibres. In the cytoplasm of the muscle cell, a tigroid-like substance and neurofibril-like fibres were recognized. Y. Yamao

- 1451—KOLMOGOROVA, E. Y., 1959. [Kafedra gistologii, Permskogo meditsinskogo instituta.] [The structure of the central parts of the nervous system of *Opisthorchis felineus*.] *Zoologicheskii Zhurnal*, 38 (11), 1627-1633. [In Russian: English summary p. 1633.]

Kolmogorova has studied, using methyl blue staining, the nervous system of *Opisthorchis felineus*; she describes and figures its gross and detailed structure and speculates on the function of the various constituents. There are eight longitudinal cords with their connectives. Two are thick, lie in the body centre, swell into ganglia near the pharynx and give off three small anterior branches. The remaining six are superficial. Of these, two are ventral, two dorsal and two lateral and only the last reach down to the posterior end of the body. Associated with the longitudinal cords are nerve cells, which differ from the two types of cord. G. I. Pozniak

- 1452—MILLER, G. C., 1959. [North Carolina State College, Raleigh, North Carolina, U.S.A.] "Studies on the genus *Homalometron* Stafford, 1904 (Trematoda: Lepocreadiidae), with a redescription of *H. armatum* (MacCallum, 1895)." *Journal of Parasitology*, 45 (5), 539-542.

Miller redescibes *Homalometron armatum* (MacCallum, 1895) Manter, 1947 from 250 specimens collected from three host species (*Aplodinotus grunniens*, *Lepomis humilis* and *L. microlophus*) from Louisiana. *H. pearsei* Hunter & Bangham, 1932, is shown to be synonymous with *H. armatum*. A table setting out the differential characteristics of the three recognized species of *Homalometron*, *H. pallidum* Stafford, 1904, *H. armatum* and *H. elongatum* Manter, 1947, is given. E. I. Sillman

- 1453—MIYAZAWA, M., 1959. [Department of Parasitology, Gifu Prefectural Medical School, Gifu.] [Studies on the secretory and excretory systems of *Setaria cervi*. II. On the morphology of the adult.] *Acta Scholae Medicinalis in Gifu*, 7 (3), 759-766. [In Japanese: English summary p. 759.]

Two pairs of cephalic glands, recognized as degenerated glands, which opened on either side of the lip papillae were present. The oesophagus was divided into two parts, muscular and glandular. The latter constituted nearly two-thirds of the oesophagus and comprised one dorsal and two subventral glands. No ducts were seen in these glands. The excretory system was



H-shaped but in the cellular layers under the lateral line no duct-like structure was found. The cervical gland opened to the left and behind the excretory bridge and, more posteriorly, fused with the oesophageal muscle.

Y. Yamao

- 1454—PAPERNA, I., 1959. [Department of Parasitology, Hebrew University, Jerusalem.] "Studies on monogenetic trematodes in Israel. 1. Three species of monogenetic trematodes of reared carp." *Bamidgeh. Israel*, 11 (3), 51–67.

Paperna describes *Dactylogyrus minutus*, *D. anchoratus* and *D. extensus*. Three new terms are proposed: "ejaculator" for the main element of the copulatory organ, "vaginal prop" for the sclerotized structure at the end of the vagina and "uterine prop" for the sclerotized structure at the uterine aperture.

I. L. Owen

- 1455—SCHILLER, E. L., 1959. [Department of Pathobiology, School of Hygiene & Public Health, The Johns Hopkins University, Baltimore, Maryland, U.S.A.] "Experimental studies on morphological variation in the cestode genus *Hymenolepis*. III. X-irradiation as a mechanism for facilitating analyses in *H. nana*." *Experimental Parasitology*, 8 (5), 427–470.

Schiller irradiated *Hymenolepis nana* eggs with doses varying from 5 to 40 kiloroentgens. 30 kr. proved to be a lethal level. When fed to *Tribolium* beetles, these eggs gave rise to a proportion of arrested or non-infective, malformed cysticercoids. Apparently normal cysticercoids fed to mice developed into adults showing certain abnormalities, particularly of the reproductive system. Adults obtained by direct infection were similarly affected. All these variations are found in non-irradiated specimens and the frequency of variants increases proportionately with the amount of radiation. The frequency of each of five variants was plotted graphically and, by extrapolation, a theoretical value for non-irradiated material was obtained, which closely agreed with actual values based on large numbers of non-irradiated specimens from the same host species. Second generation adults derived from the irradiated eggs show a greater testis-deletion effect and were highly susceptible to *Nosema helminthorum* infection. No third generation adults were obtained. Rostellar hooks of adults show no distinctive alterations. In non-irradiated *H. nana*, hook shape does not vary more between individuals than in single specimens and is thus a reliable taxonomic character. There is a full discussion of the evolution of the hymenolepidid genera and of concepts explaining the production of abnormalities. There are 6 figures, 14 tables, 29 photomicrographs and 45 references.

J. Mahon

- 1456—TAYLOR, A. E. R., 1959. [National Institute for Medical Research, Mill Hill, London, N.W.7.] "Dirofilaria magnilarvatum Price, 1959 (Nematoda: Filarioidea) from *Macaca irus* Cuvier. II. Microscopical studies on the microfilariae." *Journal of Parasitology*, 45 (5), 505–509.

The microfilariae of *Dirofilaria magnilarvatum* were photographed alive using an ultra-violet microscope, were examined alive under a phase contrast microscope and were examined after staining with Giemsa. The embryos are relatively large ( $580 \pm 10 \mu$  long;  $8 \mu$  wide) and the cells underlying the striated cuticle are larger than those found in most other microfilariae. The head is blunt and bears a small hook attached to a cuticular disc, which is connected by fibrils to two large cephalic cells. These cephalic cells are thought to correspond to Fülleborn's "roten Mundgebilde" and, because of the connections with the hook, Taylor renames them the hook-muscle cells. The nerve-ring is composed of two diamond-shaped cells, each with a large nucleus containing one nucleolus. The excretory cell is long ( $30 \mu$ ) and envelops the excretory vesicle anteriorly. The nucleus of the  $G_1$  cell is very large and often contains two nucleoli; the  $G_4$  cell lies behind the anal pore and envelops the anal vesicle. The tail is long and tapering, and cells of the nuclear column extend almost to the tip of the tail.

P. Williams

- 1457—WU, C., 1959. [Szechwan Provincial Agricultural Scientific Research Institute, Chentu, China.] [Occurrence of *Ogmocotyle* (Bhalerao, 1942) in *Ailurus fulgens styani* Thomas.] *Acta Zoologica Sinica*, 11 (4), 561–564. [In Chinese: English summary p. 564.]

Wu redescribes *Ogmocotyle indica* which was collected from the small intestine of *Ailurus fulgens styani* from south-west China.

L. S. Yeh

- 1458**—YAMASHITA, J., OHBAYASHI, M. & KONNO, S., 1957. [Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo, Japan.] "On daughter cysts of *Coenurus serialis* Gervais, 1847." *Japanese Journal of Veterinary Research*, **5** (1), 14–18.
- Yamashita *et al.* describe and illustrate *Coenurus serialis* containing daughter cysts from the subcutaneous tissues of two hares. Histological structure of the daughter cysts resembles that of the mother cyst but turned inside out. N. Jones

### Life-Cycle and Development

See also Nos.: 1182, 1240, 1268, 1282, 1303, 1334, 1385, 1440, 1443, 1450, 1455, 1499, 1507; Invertebrate Intermediate Hosts.

- 1459**—BIOCCA, E., 1957. [Istituto di Parassitologia dell'Università di Roma, Italy.] "Il contributo dell'Istituto di Parassitologia dell'Università di Roma alla conoscenza dell'ospite intermedio e del ciclo di vita degli schistosomi dei mammiferi (*Schistosoma haematobium* e *Schistosoma bovis*) in Somalia. Rilievi alla nota di Enzo Sobrero su *Bulinus abyssinicus*." *Atti della Accademia Nazionale dei Lincei. Rendiconti. Classe di Scienze fisiche, matematiche e naturali. Rome*, Serie 8, **22** (3), 376–377.

Biocca, while discussing the life-cycle of *Schistosoma haematobium* and *S. bovis* in Somalia, makes a special note of Sobrero's findings [see abstract No. 1478 below]. N. Jones

- 1460**—BRYGOO, E. R. & DODIN, A., 1957. "Expériences de transfert de la filaire et de la microfilarie de *Chamaeleo oustaleti*." *Archives de l'Institut Pasteur de Madagascar*, **26**, 119–123.

Brygoo & Dodin carried out the following experiments with *Filaria furcata*: (i) they used blood of naturally infected *Chamaeleo oustaleti* to inoculate two other hosts of the same species. The infective blood contained 70 microfilariae per 20 cu.mm. and was inoculated intraperitoneally; the first chameleon received 0.75 ml. and remained negative for the whole period of observation (15 days) whereas the second received 1.75 ml. and one or two microfilariae were found in each of four blood samples, starting from the fifth to the eighth day inclusive; no more microfilariae were found on the ninth day: (ii) an adult couple of *Filaria furcata* obtained at autopsy of *C. oustaleti*, were transplanted into the subcutaneous cellular layer of each of two *C. lateralis*; as a result microfilariae were found from the fifth to the ninth day; the first reptile died on the eighth and the second on the ninth day; the adult filariae were found still alive in the general body-cavity of the first but the parasites in the second were dead and surrounded by fibrinous tissue at the place of implantation; transplantation of microfilariae obtained from the first of these two chameleons to another *C. lateralis* was unsuccessful; it is pointed out that several years' observations of *C. lateralis* had never revealed in it a natural infection: (iii) transplantations of adult *F. furcata* into two guinea-pigs, into the subcutaneous tissue and peritoneum respectively were not successful but in both cases significant eosinophilia was observed as a result of the attempt. N. Jones

- 1461**—CRANDALL, R. B., 1959. [Purdue University.] "The biology and affinities of the turtle lung fluke *Heronimus chelydrae* MacCallum, 1902." *Dissertation Abstracts*, **20** (5), 1905.

- 1462**—DAWES, B., 1960. "The penetration of *Fasciola hepatica* into *Limnaea truncatula*, and of *F. gigantica* into *L. auricularia*." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **54** (1), 9–10.

Dawes showed that larval *Fasciola hepatica* and *F. gigantica* enter their snail hosts by breakdown of the epithelium by chemical methods, tentatively thought to be external digestion by enzymes from the larval penetration glands. He further demonstrated that it is a young sporocyst rather than the miracidium stage which actually enters the snail's body, since the epithelium of the miracidium is cast off during the tissue breakdown stages of penetration. Details of penetration vary according to the site chosen and the mechanical features of the later stages are not fully understood. N. A. Hancock

- 1463**—FENNEL, III, W. E., 1959. [University of Michigan.] "The natural history of *Dorylaimus stagnalis* (Nematoda)." *Dissertation Abstracts*, **20** (5), 1906.



**1464**—HOPKINS, C. A., 1959. [Dept. of Zoology, The University, Glasgow, U.K.] "Seasonal variations in the incidence and development of the cestode *Proteocephalus filicollis* (Rud. 1810) in *Gasterosteus aculeatus* (L. 1766)." **Parasitology**, **49** (3/4), 529–542.

*Proteocephalus filicollis* is found to exhibit an annual cycle, with a cessation of growth and maturation during the winter period. The question is raised whether a lowering of the temperature merely retards development or whether there is a relatively high threshold level, below which somatic growth may persist but no genital development occurs. The fish become infected with plerocercoids from July to November and the worms mature in the following April and May. Once ingested by the fish, the parasite remains in the gut but, with increasing age, a migration occurs from the rectum to the anterior part of the intestine. Hopkins considers that the incidence in the fish host throughout the year is a dynamic equilibrium between loss and gain with approximately 1% of the worms present being lost daily. The low incidence in the larger sticklebacks is attributed to the fact that they eat few of the copepod intermediate hosts; there was no evidence of an immunity. It is considered probable that *Cyclops*, in nature, becomes infected by accidentally ingesting an egg and that multiple infections are the exception rather than the rule. I. L. Owen

**1465**—JANSEN, Jr., J., 1957. [Instituut voor Veterinaire Parasitologie en Parasitaire Ziekten.] "Enkele beschouwingen over de 'onregelmatige histotrope fase' en 'arrested development' van nematodenlarven." **Tijdschrift voor Diergeneeskunde**, **82** (22), 875–881. [English, French & German summaries pp. 879–881.]

Jansen discusses the "abnormal histotropic phase" of Kotlan and the "arrested development" of Taylor & Michel, phrases applied to stages in the life-history of nematode larvae. He proposes that "arrested development" should include: (i) an "abnormal pre-parasitic phase", i.e. retarded or inhibited development of larvae (a) within the egg-shell, (b) free-living, (c) in an intermediate host: (ii) "abnormal histotropic phase", i.e. retarded or inhibited larvae in a normal or abnormal host, which results from a host immunity. Jansen considers that when the host reacts so strongly to a parasite that both parasite and host are endangered this can be looked upon as a parasitic disease resulting from "too great" an immunity.

A. E. Fountain

**1466**—LAURENCE, B. R. & PESTER, F. R. N., 1960. [Department of Entomology, London School of Hygiene and Tropical Medicine, London, W.C.1.] "Some aspects of the development of *Brugia patei* Buckley, Nelson and Heisch in *Mansonia (Mansonioides) uniformis* Theo." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **54** (1), 3.

When female *Mansonia uniformis* are infected with *Brugia patei* (from Kenya), damage to the thoracic flight muscles is seen, caused by movement of the larval tail. The larva begins elongating at about the fourth day and reaches the infective stage by about the ninth day. There is considerable variation in larval growth and numbers between individual mosquitoes from the third to the sixth day. The infective filariae of *B. pahangi* and *B. patei* concentrate mainly in the head and proboscis of the mosquito, while those of *Wuchereria bancrofti* are more evenly distributed. N. A. Hancock

**1467**—LI, B. T., 1959. [Shanghai First Medical College.] [The development of *Schistosoma japonicum* in unisexual and bisexual infections.] **Acta Zoologica Sinica**, **11** (4), 499–506. [In Chinese: English summary p. 506.]

Li studied the sex influence of the host on the development of male and female schistosomes, and the effect of normal copulated males and females on the development of unpaired worms. Mice of different sexes were infected with either male or female cercariae and were killed at definite intervals. The worms were measured and the development of sex organs noted. A second group of mice were infected with predominantly female cercariae, and a third group with predominantly male cercariae. Li found that sex difference in the host had a definite influence on male worms, but little influence on female worms, i.e. development of unisexual male worms in the male host was more rapid than in the female host. Female worms in the female host were only slightly bigger than those in the male host. Adult male and female schistosomes *in copula* did not hasten development of unpaired females. Copulation of worms is permanent in character, as male schistosomes did not change partners. One male schistosome could only hasten the development and maturation of one female schistosome. L. S. Yeh

- 1468—MANSON-BAHR, P., 1959. "The story of *Filaria bancrofti*. Part II. Metamorphosis of *W. bancrofti* in the mosquito and filarial periodicity." **Journal of Tropical Medicine and Hygiene**, **62** (4), 85-94.

In this second paper of the series, Manson-Bahr deals with the development in the mosquito from microfilaria to infective larva, the variation in suitability of different species of mosquitoes as hosts of *W. bancrofti*, the emergence of the infective larva from the proboscis of the mosquito and its penetration through the skin of man, chitinization of larvae in the mosquito, and the phenomenon of microfilarial periodicity with theories of its causation and of the physiological and pharmacological stimuli which can influence the numbers of microfilariae in the peripheral circulation. W. A. F. Webber

- 1469—MILLER, J. H., 1960. [Department of Microbiology, Louisiana State University School of Medicine, New Orleans, U.S.A.] "*Papio doguera* (dog face baboon), a primate reservoir host of *Schistosoma mansoni* in East Africa." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **54** (1), 44-46.

Tissue of liver and intestine, removed from 134 *Papio doguera* from Kenya on autopsy, was examined for *Schistosoma mansoni* infection. 23.9% were found to be infected, and Miller considers that *P. doguera* is thus indicated as a natural reservoir host for *S. mansoni* in East Africa. N. A. Hancock

- 1470—NODA, K., 1959. [Parasitology Department, Hawaii Agricultural Experiment Station, University of Hawaii, Honolulu, Hawaii.] "The larval development of *Stellantchasmus falcatus* (Trematoda: Heterophyidae) in the first intermediate host." **Journal of Parasitology**, **45** (6), 635-642.

Noda records the first description of a heterophyid mother sporocyst, in the course of a detailed study of the intramolluscan stages of *Stellantchasmus falcatus*. The earliest mother sporocyst was found near the intestine midway between the stomach and anus. Repeated cleavage of contained germ cells resulted in direct development of daughter sporocysts. The development of mother rediae within the daughter sporocysts, followed by daughter rediae within which cercariae are produced, is a phenomenon not previously noted in the life-cycles of digenetic trematodes. Cercariae were first seen 123 days after snails were exposed to fluke eggs.

E. I. Sillman

- 1471—OGREN, R. E., 1959. [Dickinson College, Carlisle, Pennsylvania, U.S.A.] "The hexacanth embryo of a dilepidid tapeworm. II. The epidermal glands and post-maturation changes." **Journal of Parasitology**, **45** (6), 575-579.

Ogren continues his study of the development and differentiation of the hexacanth embryo of *Dilepis undula* [for abstract see Helm. Abs., **27**, No. 247ea] with special reference to epidermal gland development and post-maturation changes in the oncosphere. The development of the epidermal gland is similar to that already described for oncospheres of *Hymenolepis nana*, *H. diminuta* and *Oochoristica symmetrica*. Post-maturation changes in the epidermal glands, nuclei, hook position and parenchyma are described and figured.

E. I. Sillman

- 1472—OGREN, R. E., 1959. [Dickinson College, Carlisle, Pennsylvania, U.S.A.] "The hexacanth embryo of a dilepidid tapeworm. III. The formation of shell and inner capsule around the oncosphere." **Journal of Parasitology**, **45** (6), 580-585.

Ogren describes and figures the formation, development and chemical nature of the shell and extra-embryonic membranes of the oncosphere of *Dilepis undula*.

E. I. Sillman

- 1473—OSCHE, G., 1959. [Zoologisches Institut der Universität, Erlangen, Universitätsstrasse 19, Bavaria.] "Über Zwischenwirte, Fehlwirte und die Morphogenese der Lippenregion bei *Porrocaecum*- und *Contracaecum*-Arten (Ascaridoidea, Nematoda)." **Zeitschrift für Parasitenkunde**, **19** (5), 458-484.

Osche discusses host specificity and the morphogenesis of the lips in *Contracaecum* spp. and *Porrocaecum* spp. In this discussion he refers to his own findings as well as to those of other authors. *Porrocaecum semiteres* third-stage larvae are described, which on one occasion were found together with a *P. ensicaudatum* larva, from *Neomys fodiens*. The most important differential characteristic between *P. crassum*, *P. ensicaudatum* and *P. semiteres* is given as the ratio of the size of the intestinal caecum to that of the oesophageal ventricle. These three



species, on account of morphological similarities, especially the structure of the lips and the egg-shell, and of the identity of the invertebrate intermediate host (earthworms), are referred to by the author as the "*ensicaudatum* group". From the abnormal behaviour of *Porrocaecum* spp. in mammals, the author concludes that these species are limited to birds as final hosts. The behaviour of *Porrocaecum* larvae is described in some bird species, which were accidental hosts; very few larvae reached the fourth stage and none reached the adult stage. Morphogenesis of the lip structure of *Contracaecum* and *Porrocaecum* is compared. While the lips of the fourth-stage *Contracaecum* larvae are well differentiated, *Porrocaecum* shows even more differentiated lips with more primitive ones, like those of *Contracaecum*, among them. The reverse situation is observed as regards the formation of the interlabia, which is completed more quickly in *Porrocaecum*.

N. Jones

**1474**—OSHANOVA, N., 1959. [Zoologicheski Institut, Sofia, Bulgaria.] [Hibernation of parthenogenetic forms of *Fasciola hepatica* L. in the Sofia region.] *Wiadomości Parazytologiczne*, **5** (4/5), 357–359. [In Russian; English & Polish summaries p. 359.]

Oshanova reports that investigations carried out in the Sofia region in 1956–58, led to the following conclusions: (i) parthenogenetic forms of *Fasciola hepatica* normally survived the winter within *Galba truncatula* and could be found in February; however, in 1957 infected *G. truncatula* did not appear until the middle of May; this was caused by a drought in the preceding year, only young, uninfected snails surviving: (ii) the intensity of infection among infected snails was 30.1% in August 1957, and 14.7% and 4.4% in February and April respectively of 1958. It is concluded that domestic animals could be infected throughout the year, a fact which was confirmed by the sanitary-veterinary service.

N. Jones

**1475**—PEMBERTON, R. T., 1959. [Department of Zoology, University of Leeds, U.K.] "Life-cycle of *Cyathostoma lari*, Blanchard 1849 (Nematoda, Strongyloidea)." [Correspondence.] *Nature*, **London**, **184** (4696), 1423.

Pemberton records *Cyathostoma lari* from *Larus ridibundus*, *L. cinereus*, *Corvus frugilegus*, *C. monedula*, *Sturnus vulgaris* and *Ardea cinerea* in northern England. He describes two preliminary experiments which attempt to elucidate the life-cycle of this nematode. In the first experiment eggs and larvae of *Cyathostoma lari* were fed to month-old chickens which were examined for helminths 21 to 28 days later, but none were found. In the second experiment *C. lari* eggs were pipetted into the gut of earthworms, *Lumbricus terrestris*. Three weeks later the earthworms were fed to three-week-old chickens, while further birds received eggs and larvae. The birds were killed and examined three to four weeks later. One adult female *C. lari* was found in the orbital sinus of one bird which had received earthworms; no helminths were found in any of the other birds. Pemberton considers that the 54 days taken for the experimental life-cycle may be less in nature.

I. C. Williams

**1476**—SAWADA, I., 1959. [Biological Laboratory, Nara Gakugei University, Nara, Japan.] "Studies of the life history of the chicken tapeworm, *Raillietina* (*Paromiella*) *kashiwarensis* Sawada." *Journal of the Nara Gakugei University*, **8** (2), 31–63.

Sawada describes the adult tapeworm and the development of the oncosphere and cysticeroid larva of *Raillietina* (*Paromiella*) *kashiwarensis*. The oncosphere is enveloped in three membranes and, on being eaten by the larval stage of a worker-ant of *Euponera solitaria*, develops into a cysticeroid in approximately the same time (30 days) as the ant takes to mature. Oncospheres failed to develop into cysticeroids if eaten by an adult ant. The cysticeroid has no caudal appendage and takes seven days to mature in the small intestine of a chicken. Growth of the strobila in the final host is restricted largely to the period between the sixth and thirteenth day, coinciding with the gradual decrease in the proliferation of proglottides. Sawada found that ants were parasitized throughout the year but with a maximum infection (63.4%) in November immediately before hibernating. None of the other 13 species of insects and earthworms examined was found to harbour mature cysticeroids. The longevity both of the cysticeroid in the ant and of the adult in the chicken is thought to be at least four to five months.

I. L. Owen

- 1477—SHEN, W. X., 1959. [Chungshan Medical College, Canton.] [Notes on the morphology and life history of *Haplorchis pumilio* (Trematoda: Heterophyidae).] *Acta Zoologica Sinica*, 11 (4), 470–481. [In Chinese: English summary p. 481.]

Shen describes the life-history and morphology of *Haplorchis pumilio*. Metacercariae were collected from fresh-water fish and fed to ducks and white mice. The redial and cercarial stages are described from experimental infections in *Melanoides tuberculata chinensis*. Shen found the skin glands of metacercariae and adult worms very variable and unreliable as a taxonomic character. L. S. Yeh

- 1478—SOBRERO, E., 1957. "*Bulinus* (*Physopsis*) *abyssinicus*, ospite intermedio di *Schistosoma haematobium* in Somalia. Ricostruzione del ciclo di vita del parassita." *Atti della Accademia Nazionale dei Lincei. Rendiconti. Classe di Scienze fisiche, matematiche e naturali*. Rome, Serie 8, 22 (4), 553–554.

Sobrero obtained *Schistosoma haematobium* by experimentally infecting laboratory animals with furcocercariae obtained from *Bulinus* (*Physopsis*) *abyssinicus*. The infected snails were collected near the river Uebi-Scebeli (Somalia) in areas endemic for this infection. N. Jones

- 1479—SZIDAT, L., 1959. "Hormonale Beeinflussung von Parasiten durch ihren Wirt." *Zeitschrift für Parasitenkunde*, 19 (5), 503–524.

Szidat, in a discussion of the influence of host hormones on the developmental cycle of parasites, reviews some of his own work as well as that of other authors, with particular reference to laboratory experiments and to findings on modified developmental cycles of hereditary value [for abstracts see Helm. Abs., 23, No. 886a, 25, Nos. 315b & 323a]. The author also discusses the role of environmental conditions in genetics in general. N. Jones

- 1480—THOMAS, R. J., 1959. [Department of Agriculture, King's College, Newcastle-on-Tyne, U.K.] "A comparative study of the life histories of *Nematodirus battus* and *N. filicollis*, nematode parasites of sheep." *Parasitology*, 49 (3/4), 374–386.

Thomas describes the life-history of *Nematodirus battus* and *N. filicollis*. The third-stage larva of *N. battus* developed in 28 to 30 days when eggs were incubated at 22°C. At 15°C. 50 days were required. Hatching did not occur in cultures but the larvae became active if they were released by rupturing the egg-shell. When third-stage larvae of *N. battus* were administered to lambs the fourth stage was found five days after infection but no adults appeared until the eighth to 12th day, eggs being found on the 15th day. Histological examination showed that the fourth-stage larvae invaded the wall of the intestine and remained there until the young adult stage. The young adults caused considerable damage, eroding the epithelium and penetrating the lamina propria. *N. filicollis* appeared to have a very similar life-history, but the rate of development was different. The third stage was reached after 24 to 27 days incubation at 21°C. and after 20 days at 28°C. Fourth-stage larvae appeared five days after lambs were infected and young adults were found on the 15th day. Comparing his results with work on *N. helvetianus* and *N. spathiger* Thomas suggests that there is a marked difference between species in relation to hatching, *N. battus* and *N. filicollis* requiring a specific environmental stimulus for hatching, whereas the other two species hatch readily when the third stage is reached. H. D. Crofton

- 1481—TURNER, H. F., 1957. [Alabama Polytechnic Institute, Auburn, Alabama.] "Preliminary notes on the life cycle of *Fibricola cratera* (Barker and Noll, 1915) Dubois 1932 (Trematoda; Diplostomatidae)." *Journal of the Alabama Academy of Science*, 29, 43–44.

Turner gives a very brief account of the larval stages of *Fibricola cratera*. The adult produces few eggs which develop into free-swimming miracidia with two flame cells, conspicuous eye-spots and four tiers of ciliated epidermal plates (6:9:4:3). The miracidia penetrate and develop in *Physa*. Two sporocyst generations occur and the daughter sporocysts produce cercariae about 25 days after exposure of the snails to miracidia. The furcocercous cercariae, which are shed in large numbers, possess two pairs of penetration glands and six pairs of flame cells. Only the bodies of the cercariae penetrate the tadpoles where they quickly transform into metacercariae and can be seen in the body-cavity crawling actively over the internal organs. After metamorphosis of the tadpoles they migrate to the pelvic musculature and



encyst. When eaten by a definitive host (laboratory mice in this study), they encyst, grow a hind-body, attach themselves to the intestinal villi and, in five to six days, produce eggs. S. Willmott

**1482**—VOGE, M. & HEYNEMAN, D., 1957. "Development of *Hymenolepis nana* and *Hymenolepis diminuta* (Cestoda: Hymenolepididae) in the intermediate host *Tribolium confusum*." **University of California Publications in Zoology**, **59** (9), 549-579.

A comparative study of the larval development of *Hymenolepis nana* and *H. diminuta* in experimentally infected *Tribolium confusum* is presented. Five major morphological steps have been established in the formation of the cysticeroid: (i) appearance of the hexacanth larva in the body-cavity of the host followed by initial growth; (ii) cavity formation; (iii) elongation followed by appearance of sucker and rostellum rudiments; (iv) withdrawal of scolex; and (v) maturation of holdfast. A detailed consideration of these stages in the two species is given. The principal difference lies in the rate of development, namely, a more rapid early growth with the resulting greater total size and an earlier appearance of the tail in *H. diminuta*, and a more rapid but more variable morphogenesis in *H. nana*. Factors responsible for the variability observed are discussed in terms of a physiological crowding effect in the beetle host. The pattern of development is compared with that described for some other cestodes and the paper is amply illustrated with drawings and photomicrographs. G. I. Pozniak

**1483**—YAMASHITA, J., OHBAYASHI, M., KITAMURA, Y., SUZUKI, K. & OKUGI, M., 1958. [Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo.] "Studies on echinococcosis. VIII. Experimental echinococcosis multilocularis in various rodents; especially on the difference of susceptibility among uniform strains of the mouse." **Japanese Journal of Veterinary Research**, **6** (3), 135-155.

Various species of rodents, including ten strains of mice, were experimentally examined for susceptibility to *Echinococcus multilocularis*. The infection was not successful in albino hamsters and one *Apodemus speciosus ainu*. In the remaining hosts, two types of infection could be distinguished. In the first type, which was observed in strains "AKR" and "dba" of *Mus musculus* (100% infection), *Clethrionomys rufocanus bedfordiae*, *C. rutilus mikado*, *A. geisha*, *Eutamias asiaticus lineatus*, *Microtus montebelli montebelli* and *Meriones unguiculatus*, the hydatid cysts were large and developed rapidly, scoleces could be detected after six to ten weeks, and the host tissue reaction was slight. These species therefore represent good hosts although the rates of infection need not always be high. In the second type, which was observed in the mouse strains "dd", "C57BL/6", "CF 1", "b", "CFW", "A", "BALB/C" and "C3H/He", the cysts were minute and developed slowly, more than five months were required for scolex formation, and the tissue reaction was severe. This group therefore contains the less suitable hosts; man also is included in this group. The authors emphasize that in helminthological experimental work, the existence of host strains must be taken into consideration. G. I. Pozniak

### Bionomics

See also Nos.: 1068, 1124, 1163, 1171, 1180, 1248, 1253, 1254, 1256, 1260, 1266, 1268, 1273, 1303, 1305, 1306, 1309, 1318, 1390, 1443, 1448, 1462, 1463.

**1484**—ANTONY, N. M., 1959. [University of Southern California.] "Types and sources of pigments in certain species of larval trematodes." **Dissertation Abstracts**, **20** (5), 1902.

**1485**—BÉNEX, J. & LAMY, L., 1959. [Institut Pasteur, Service de Parasitologie, Paris.] "Immobilisation des miracidiums de *Schistosoma mansoni* par des extraits de planorbes." **Bulletin de la Société de Pathologie Exotique**, **52** (2), 188-193.

Bénex & Lamy investigated the effects of introducing *Schistosoma mansoni* miracidia into extracts of snail tissue. The tissues were ground up and distilled water added to the extract to give a final dilution of 1:10. The extract was allowed to stand for four to five hours then centrifuged and the supernatant removed and used for the tests. The miracidia were obtained by hatching eggs from hamsters infected with the Caribbean strain of *S. mansoni*. Four

different snails were used: *P. corneus* which is entirely refractory; *A. glabratus* Brazil which is a good host for *S. mansoni* in its own area but could not be experimentally infected with the Caribbean strain; *A. glabratus* Pointe-à-Pitre into which the Caribbean strain of miracidia will penetrate but not develop; and *A. glabratus* Caribbean. The results were as follows: *P. corneus*—all the miracidia were immobilized in 15 to 30 minutes; *A. glabratus* Brazil—immobilization was produced in 30 to 45 minutes but one individual, although inactive, survived; *A. glabratus* Pointe-à-Pitre—all the miracidia were alive after one hour but some were slightly affected; *A. glabratus* Caribbean—all the miracidia were alive and active after several hours. Control miracidia in pond water were always active but in physiological saline all were dead in less than five minutes.

D. L. H. Robinson

- 1486**—BERGESON, G. B., 1959. [Department of Botany and Plant Pathology, Purdue University, West Lafayette, Indiana, U.S.A.] "The influence of temperature on the survival of some species of the genus *Meloidogyne*, in the absence of a host." *Nematologica*, **4** (4), 344–354. [German summary p. 354.]

Larvae of *Meloidogyne incognita* var. *acrita* held in moist, sterilized soil at different temperatures failed to survive seven days at 32°F. or 14 days at 40°F. A few survived 12 months at 50°F. but at 60°F., 70°F. and 80°F. most died within three months, and at 90°F. and 100°F. they died in two months and one month respectively. In the form of egg masses survival was best at 50°F. (12 months) and 40°F. (six months). Few survived one month at 32°F. and pre-treatment at low temperatures had no influence on subsequent survival at this temperature. Eggs and larvae of two populations of *M. hapla* survived better at 32°F. than those of *M. incognita* var. *acrita* or *M. javanica*. When egg masses of *M. incognita* var. *acrita* were kept in water at constant temperatures the hatching peak was reached on the fourth day at 90°F. and the seventh day at 70°F. and 80°F., after which the rate of hatch fell rapidly. The hatch fell to zero in seven days at 40°F., in 13 days at 90°F., 16 days at 80°F. and in 22 days at 50°F. and 70°F. At 60°F. hatching continued for seven weeks. The eggs held at 70°F. and 80°F. appeared to have died but those at 50°F. and 90°F. remained viable.

M. T. Franklin

- 1487**—CAVIER, R., SAVEL, J. & MONTEOLIVA, M., 1958. [Laboratoire de Parasitologie de la Faculté de Pharmacie, 4, Avenue de l'Observatoire, Paris (6e)] "Nature et répartition, selon le sexe, des substances lipidiques chez *Ascaris lumbricoides* Linné, 1758." *Bulletin de la Société de Chimie Biologique*, **40** (1), 177–187. [English & German summaries p. 186.]

Cavier *et al.* have summarized the available analytical data on the lipids in tissues of *Ascaris lumbricoides*. Where figures were lacking they have themselves estimated total lipids, volatile fatty acids, triglycerides, phospholipids and unsaponifiable materials. A study by means of paper electrophoresis, of which very few details are given, was carried out to examine the relationship of protein, lipids and phospholipids in body fluid.

W. P. Rogers

- 1488**—CHIANG, P. C., 1959. [Municipal Station of Parasitic Diseases, Darien, China.] "Influence of cold weather upon the viability of eggs and larvae of hookworms." [Abstract.] *Chinese Medical Journal. Peking*, **78** (3), 270.

Soil samples containing ova or larvae of hookworms [species not stated] in special containers were buried near the surface in a field and examined at monthly intervals between December and the following May. Neither ova nor larvae survived the winter and died more quickly in the coldest periods.

N. A. Hancock

- 1489**—CHRISTIE, J. R., 1957. [University of Florida and Agric. Exper. Station, Gainesville, Florida.] "*Meloidogyne*: life history, biology, races, pathogenicity, and other topics dealing with root-knot nematode research." *Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee*, July 1–6, 1957, 9 pp.

Christie discusses in general terms some aspects of the bionomics and host-parasite relationships of root-knot nematodes. He mentions the influence on hatching of moisture and oxygen. He considers that, after hatching, larvae may or may not re-enter the root from which they have come according to the suitability of the plant tissues. Resistance may be due to the failure of larvae to enter the roots, or to the starvation of larvae within the roots owing to the unsuitability of the tissues for their feeding. An example is given of a soya bean variety in which root-knot



larvae were unable to develop in the roots but developed abundantly in the bacterial nodules. Examples are given of other plants in which galls are produced in which it is extremely difficult to find nematodes because they have died and disintegrated.

M. T. Franklin

- 1490**—DOUGHERTY, E. C. & HANSEN, E. L., 1957. [University of California, Berkeley, U.S.A.] "The folic acid requirement and its antagonism by aminopterin in the nematode *Caenorhabditis briggsae* (Rhabditidae)." [Abstract of paper presented at the 54th Annual Meeting of the American Society of Zoologists, August 26–29, 1957.] **Anatomical Record**, **128** (3), 541–542.

- 1491**—DURRANI, M. Z., 1958. "Oxidative metabolism of *Parascaris equorum*." **Pakistan Journal of Scientific Research**, **10** (4), 129–132.

Durrani measured the oxygen uptake of *Parascaris equorum*. His results in  $\mu\text{l.}$  per gm. wet weight per hour at 39°C. were as follows: (i) whole worms, in saline 114 and in IM phosphate (pH 7.5) 74; (ii) muscle pulp, in saline 6,000, in distilled water 2,300, in 2.6% glucose 3,100 and in 0.03M succinate 7,200. Mature eggs consumed 65  $\mu\text{l.}$  per 1,000 eggs per hour. [Results obtained by other workers are not mentioned.]

W. P. Rogers

- 1492**—ENTNER, N. & GONZALEZ, C., 1959. [Department of Preventive Medicine, New York University Medical School, New York, N.Y.] "Fate of glucose in *Ascaris lumbricoides*." **Experimental Parasitology**, **8** (5), 471–479.

Entner & Gonzalez incubated *Ascaris lumbricoides* for 24 hours in a sterile salt medium containing glucose- $\text{C}^{14}$  (uniformly labelled), glucose-1- $\text{C}^{14}$ , glucose-2- $\text{C}^{14}$ , or glucose-6- $\text{C}^{14}$ .  $\text{C}^{14}$  entered every major fraction that was isolated; it was highest in glycogen and in the fermentation acids which were excreted. The distribution of  $\text{C}^{14}$  in intermediates and end products indicated that glycolysis was the major pathway with small contributions from the pentose-phosphate and possibly other routes.

W. P. Rogers

- 1493**—FERRARI, G., 1957. [Istituto di Fisiologia umana dell'Università di Pavia.] "Consumo di ossigeno nella cute di alcune specie di irudinei." **Bollettino della Società Italiana di Biologia Sperimentale**, **33** (10/11), 1453–1454.

Ferrari studied cutaneous respiration of *Hirudo medicinalis*, *Haemopsis sanguisuga*, *Herpobdella testacea*, *H. lineata* and *Clepsine* in vitro. Pulped skin was used in the case of the first two species and entire pulped leeches in the case of the other species. Ten determinations were made for each species and the data obtained were in accord with those given by other authors. Referring to previous work [for abstract see Helm. Abs., **21**, No. 635c], the author concludes that the rate of oxygen consumption by *Hirudo medicinalis* and *Haemopsis sanguisuga* cannot be, at least under normal conditions, an indicator of the quantity of riboflavine in their skin.

N. Jones

- 1494**—GRIGORYAN, G. A., 1959. [Azerbaidzhanski selskokhozyaistvenni institut.] [Experimental data on the length of survival of the adolescaria of *Fasciola gigantica*.] **Veterinariya**, **36** (12), 35–37. [In Russian.]

Grigoryan used three to eight-day-old *Fasciola gigantica* adolescaria, obtained from experimentally infected *Radix ovata*, to study their resistance to various environmental conditions. The experiments and results were as follows: (i) a lamb was successfully infected with 400 adolescaria (10% to 15% of which were not encysted) preserved in a sheaf of freshly cut hay in a haystack for 15 days at temperatures ranging from 21°C. to 32°C. and relative humidities between 30% and 50%; four-and-a-half to five months later four adult flukes were found. An attempt to infect two other lambs with twice as many adolescaria preserved in the same manner, but for 35 days, failed. (ii) Two lots of 215 and 205 adolescaria were placed on fresh lucerne leaves, in petri dishes (with the lids ajar) in shade, at 24°C. to 29°C. with 60% to 75% air humidity for five and 15 days respectively before feeding to lambs. Ninety days later 25 flukes were found in the lamb that received those kept for five days but none in the lamb given those kept for 15 days. (iii) Five lots, each of 400 adolescaria, wrapped in lucerne leaves, were placed in silage during its preparation at the end of June. 30 days later two lambs were given 400 and 800 of these adolescaria respectively. After a further 20 days the other 800 adolescaria were given to another lamb. Four-and-a-half to five months later

no infection was found at autopsy of any of these lambs. (iv) Adolescaria were preserved in water, periodically renewed, and kept in the shade at 16°C. to 21°C.; 375 to 505 of these were used to infect four animals and 1·8% to 6·4% of them developed into flukes. An attempt to infect an animal with ten-month-old adolescaria proved unsuccessful. (v) Four lots of 106 to 200 adolescaria were preserved in water under varying conditions at an over-all temperature ranging from -2°C. to 56°C. and in direct sunlight. All of four sheep became infected from these but only 0·9% to 6% of the adolescaria reached the adult stage. N. Jones

**1495**—HARGIS, Jr., W. J., 1957. [Virginia Fisheries Laboratory, Virginia, U.S.A.] "The host-specificity of monogenetic trematodes." [Abstract of paper presented at the 35th Annual Meeting of the Virginia Academy of Science, May 8-11, 1957.] *Virginia Journal of Science*, 8 (4), 296. [The full account of this paper appears in *Exper. Parasit.*, 6, 610-625. For abstract see *Helm. Abs.*, 26, No. 377e.]

**1496**—IZYUMOVA, N. A., 1958. [Zoologicheski institut, Akademiya nauk SSSR.] [Oxygen content of a water reservoir as one of the factors influencing the biology of *Dactylogyrus solidus* and *D. vastator*. *Parazitologicheski Sbornik*, 18, 295-303. [In Russian: English summary p. 303.]

A reduction in the oxygen content of water (at constant temperatures) had a generally depressing influence on *Dactylogyrus solidus*. The worms moved towards the ends of lamellae on the first and fourth gill arch for better aeration, and the number of eggs laid increased. Reduced oxygen content, even when the deficiency was considerable, did not affect the behaviour of *D. vastator*. G. I. Pozniak

**1497**—JARMAN, M., 1959. [Department of Zoology, The University, Bristol 8, U.K.] "Electrical activity in the muscle cells of *Ascaris lumbricoides*." [Correspondence.] *Nature*, 184 (4694), 1244.

Jarman, who used potassium chloride microelectrodes, has succeeded in recording the electrical activity of the swollen bodies of muscle cells of *Ascaris lumbricoides*. Simple or complex spikes, about three or four per second, which did not completely discharge the resting potential, were produced. Recordings taken from cells a few millimetres apart were similar when the cells lay in the same muscle field and when the nerve cord was intact. Cutting the nerve cord abolished the correlation of the spikes. The cells nearest the cord or, when the cells were equally distant from the cord the anterior cell, gave the first pulse. There was no correlation in the pulses when the cells were in different muscle fields. W. P. Rogers

**1498**—JONES, F. G. W., 1957. [Rothamsted Experimental Station, Harpenden, Herts, U.K.] "*Heterodera*." *Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee*, July 1-6, 1957, 13 pp.

Jones discusses various aspects of the bionomics of cyst-forming nematodes of the genus *Heterodera*, viz., life-history, pathology, development of the egg sac, response to root diffusates, resistance to desiccation, host ranges, ecology, soil populations and the assay of root diffusates. [The article is an unproofed tap transcript and contains many errors.]

F. G. W. Jones

**1499**—KLESOV, M. D. & POPOVA, Z. G., 1959. [Study of the biology of *Dicrocoelium* and the epizootiology of dicrocoeliasis in ruminants.] *Nauchnie Trudi. Ukrainski Nauchno-Issledovatel'ski Institut Eksperimentalnoi Veterinarii*, 25, 5-18. [In Russian.]

Klesov & Popova report on their findings on dicrocoeliasis in the Kharkov region. (i) 20,369 specimens of *Formica pratensis*, *Polyergus rufescens* and *Lasius niger* were examined on three infected farms from May to November inclusive. The incidence of *Dicrocoelium dendriticum* metacercariae in 18,053 *F. pratensis* ranged from 0·09% to 0·45%, with a burden of from one to 251 metacercariae per ant. The other two ant species were not infected. (ii) To ascertain the role of *F. pratensis* in the distribution of *D. dendriticum*, four rabbits were infected orally with 148 to 310 metacercariae isolated from *F. pratensis*. Adult flukes were found within 77 days of infection in all the rabbits but their average size was less than that of those from sheep. Benzene hexachloride and D.D.T. dusts were effective against the ants. An experiment with 1,601 chickens showed that the birds destroyed *F. pratensis* in preference to *Lasius niger*, the latter being smaller, so providing an effective control method. N. Jones



- 1500**—KRÁLOVÁ, E. & ŠAFRÁNEK, V., 1957. "Helminthologický průzkum u sedimentů z čistírny odpadních vod v Kuřimi." *Československá Hygiena*, 2 (7), 399–404. [English & Russian summaries p. 404.]  
 Králová & Šafránek examined the sediments at a sewage farm at Kurim once a month for a whole year. *Ascaris lumbricoides* and *Trichuris trichiura* infections occurred in that area. The maximum number of eggs (86) was found in putrified sediment. *A. lumbricoides* eggs prevailed in both putrified and fresh sediments. Those of *Enterobius vermicularis* and *T. trichiura* were in equal numbers in the fresh sediment. Only once was an egg of *Hymenolepis nana* found. Incubation revealed that up to 100% of eggs from the fresh sediment and 17·1% to 58·3% of those from the putrified sediment were viable. N. Jones
- 1501**—KRUSBERG, L. R., 1960. [North Carolina State College, Raleigh, N.C., U.S.A.] "Hydrolytic and respiratory enzymes of species of *Ditylenchus* and *Pratylenchus*." *Phytopathology*, 50 (1), 9–22.  
 Homogenates and extracts of *Ditylenchus trifurmis*, *D. dipsaci* and *Pratylenchus zeae* were assayed for hydrolytic, respiratory and terminal oxidative enzymes by viscosity, titration, colorimetric and spectrophotometric techniques. Cellulolytic enzyme activity was present in homogenates of all three nematodes. Krusberg detected the presence of pectinmethylesterase, amylase, hexokinase, phosphoglucomutase, phosphoglyceric mutase-enolase, glucose-6-phosphate dehydrogenase, 6-phosphogluconic dehydrogenase, condensing enzyme, isocitric dehydrogenase, malic dehydrogenase, "malic" enzyme, diaphorase and DPNH-cytochrome c reductase. Lactic dehydrogenase activity was present in extracts from *D. trifurmis* but doubtful in *D. dipsaci*. Fumarase and cytochrome oxidase were detected in extracts from *D. trifurmis*. Variable protease and no polygalacturonase activity were found in homogenates of the three nematode species. Krusberg concludes that although all the enzymes in the various metabolic pathways were not demonstrated it is, nevertheless, possible to see a broad picture of metabolism which is similar to that in other animals including animal-parasitic nematodes. H. R. Wallace
- 1502**—LIPKOVÁ, V., 1957. [Oblastný ústav hygieny, Bratislava, Czechoslovakia.] "O možnosti asanácie uzavretých priestorov detských kolektívnych zariadení od vajíčok geohelminťov." *Československá Hygiena*, 2 (5), 313–320. [English & Russian summaries p. 319.]  
 Saponated cresol solution (10%), phenol (7%), calcium hypochlorite (3%) and chloramine (4%) solutions destroyed all *Enterobius vermicularis* eggs *in vitro* in five minutes. These disinfectants as well as "ajatin", "ryfen" and *o*-cresol showed no efficacy against the eggs of *Ascaris lumbricoides* and *Trichuris trichiura* within 15 minutes of exposure. The last three disinfectants had no effect against *E. vermicularis* eggs either. N. Jones
- 1503**—MAKIDONO, J. & TAKAHASHI, S., 1959. [Clinical Radiology Research Institute, Hiroshima, Japan.] [The effect of *Chondria aromata* and its effective component (domoic acid) on the physiology of *Ascaris lumbricoides* in the human body and the mechanism of their anthelmintic effect.] *Journal of the Hiroshima Medical Association*, 12 (1), 50–63. [In Japanese: English summary p. 51.]  
 It was confirmed by radiological examination that domoic acid, isolated from *Chondria aromata* (Rhodophyceae), showed a neurotoxic action for *Ascaris lumbricoides* and stimulated peristalsis of the human intestine. Compared with santonin or kainic acid, domoic acid acted faster and longer with no side effects on the human body. Y. Yamao
- 1504**—MATSUDA, K., 1959. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka.] [Enzymatic studies on the toxin of *Gnathostoma spinigerum*.] *Fukuoka Acta Medica*, 50 (7), 2301–2321. [In Japanese: English summary pp. 2301–2302.]  
 A parasitological examination was made on the spreading factor and the proteolytic activity of extracts of the whole body, the oesophagus, and the remaining part of the body of the third-stage larva and the adult form of *Gnathostoma spinigerum* and the solution used for their maintenance. Examination by the intracutaneous diffusion method revealed that the spreading factor existed in the extracts, particularly in that of the oesophagus, and in the culture fluid. The hyaluronidase was contained in the body extract from the third-stage larva and the adult

form of the parasite. The body of a third-stage larva of the worm and its extract contained a proteolytic enzyme. Anti-hyaluronidase, an enzyme acting against bovine testicular hyaluronidase in the blood serum in the experimental gnathostomiasis, did not markedly increase, probably because anti-hyaluronidase was type-specific. Y. Yamao

- 1505—OLLERENSHAW, C. B., 1959. [Central Veterinary Laboratory, Weybridge, Surrey, U.K.] "The ecology of the liver fluke (*Fasciola hepatica*)."  
**Veterinary Record**, 71 (45, Pt. 2), 957-963.  
 [Discussion pp. 963-965.]

In this exhaustive account of the ecology and epizootiology of *Fasciola hepatica* in Great Britain, Ollerenshaw draws attention to the phases in the life-cycle of the parasite when natural forces, especially temperature and humidity, may have greatest influence in promoting or preventing outbreaks of fascioliasis. The high aestivation potential of *Lymnaea truncatula* under English conditions coupled with the high rate of fluke infection in sheep and cattle, especially imported Irish cattle, and the persistence of the rabbit as a wild host compensate partly for the many known hazards causing wastage at the various developmental stages of the parasite. Evidence suggests that high fluke egg density in a low snail population can lead to dangerous herbage infestations; less than five infected snails per square mile can produce losses from the acute form of fascioliasis. From seasonal temperature and field moisture studies it is possible to predict outbreaks and a useful diagram illustrates the seasonal timing of the life-cycle of *F. hepatica* in Britain. T. J. Coyle

- 1506—OVERGAARD NIELSEN, C., 1957. [Molslaboratoriet, Femmøler, Denmark.] "Nematode ecology." **Proceedings of the S-19 Workshop in Phytonematology, University of Tennessee**, July 1-6, 1957, 4 pp.

Soil nematodes are essentially aquatic organisms, very dependent on the available moisture of the habitat. Certain species, however, have evolved the ability to withstand periodic desiccation and thus exploit drier habitats. *Plectus rhizophilus* is an extreme example of this, able to live in moss tufts on tree trunks, where available water is but fleetingly present. As a soil dries out, activity of soil nematodes ceases, somewhat before the wilting range of higher plants is reached. Nematodes feed selectively, all species with stylets sucking the liquid contents of living cells, whereas most others swallow small particles, chiefly bacteria and small algae, although a few species capture and swallow larger organisms. Some data on oxygen consumption are given, from which Overgaard Nielsen calculates that the soil nematodes in a square metre of grassland may eat almost a ton of bacteria in a year. R. D. Winslow

- 1507—POPOVA, Z. G., 1959. [A study of the biology of *Gongylonema pulchrum* Molin, 1857 from farm animals.] **Nauchnie Trudi. Ukrainski Nauchno-Issledovatel'ski Institut Eksperimentalnoi Veterinarii**, 25, 19-30. [In Russian.]

Popova examined 5,418 specimens of Coleoptera, representing Scarabaeidae, Tenebrionidae, Hydrophilidae and Histeridae and belonging to 14 genera and 38 species, collected on pastures carrying *Gongylonema* in the Kherson district (southern Ukraine). *Gongylonema pulchrum* larvae were found in 27 species. Five of these records were new, namely, *Onthophagus taurus*, *Caccobius schreberi*, *Aphodius haemorrhoidalis*, *A. fimetarius* and *Oniticellus fulvus*. The incidence of infection ranged from 1.4-45% and up to 19 larvae per beetle were found. All larvae were in the last developmental stage and most were encysted. It is suggested that the simultaneous presence of encysted and unencysted infective larvae implies that it is possible for these larvae to leave their host for the external environment. From 16 species of beetle, larvae (mostly encysted) of *Spirocerca lupi*, *Ascarops strongylina* and *Physocephalus sexalatus* were also recovered. Seven rabbits were each infected *per os* with 25-52 *G. pulchrum* larvae from various beetles and adults were obtained in all seven at autopsy 78 to 85 days alter. It was similarly established that these larvae migrate to the mucous membrane of the digestive tract within 24 hours of infection and develop there to adults during the two following months. N. Jones

- 1508—PROST, M., 1959. [Zakład Parazytologii Wydz. Weterynarii W.S.R., Lublin, Poland.] "Wpływ czynników ekologicznych na faunę Monogenoidea u ryb." **Wiadomości Parazytologiczne**, 5 (4/5), 453-458. [English summary pp. 457-458.]

Prost, following her observations of the fauna of Monogenoidea from fishes along the whole



course of the Vistula, makes some suggestions concerning the influence of ecological factors on these parasites. She attaches no great importance to biotic factors and discusses principally the physical and chemical factors. Speed of current, suspended particles, temperature, low oxygen content, contamination and high chloride content were unfavourable. This last-mentioned factor was particularly important in cases of abrupt change. However, two out of the 20 species examined, namely, *Dactylogyrus crucifer* and *D. difformis*, were more frequent in water with a high salt content than otherwise, perhaps owing to the migration of their hosts into the sea.

N. Jones

**1509**—RHOADES, H. L., 1959. [University of Illinois.] "Biological studies of some nematodes of the genus *Paratylenchus* Micoletzky, 1922." **Dissertation Abstracts**, 20 (6), 1946-1947.

**1510**—ROSE, J. H., 1959. [Ministry of Agriculture, Fisheries and Food, Central Veterinary Laboratory, Weybridge, U.K.] "*Metastrongylus apri* the pig lungworm. Observations on the free-living embryonated egg and the larva in the intermediate host." **Parasitology**, 49 (3/4), 439-447.

Rose reports that both field observations and laboratory experiments indicated the adverse effect of dryness upon the viability of embryonated eggs of *Metastrongylus apri* in soil. Such eggs were able to overwinter in the field despite a considerable amount of frost and are capable of surviving up to two years and possibly longer in soil; while both eggs and first-stage larvae survived for many months at room temperatures. Rate of development of larvae in the intermediate host was reduced as the temperature fell. Although the infective larvae were able to survive for a time when separated from the earthworm's tissues, their longevity appeared to be largely determined by the length of life of the intermediate host. Unfortunately, the lifespan of earthworms under natural conditions is not known. These matters are discussed in relation to persistence of infection under natural conditions and it is concluded that, on pasture, lungworm infestation may persist for several years.

J. M. Watson

**1511**—ROWAN, W. B. & GRAM, A. L., 1959. [Communicable Disease Center, Bureau of State Services, Public Health Service, U.S. Department of Health, Education and Welfare, San Juan, Puerto Rico.] "Relation of water velocity to *Schistosoma mansoni* infection in mice." **American Journal of Tropical Medicine and Hygiene**, 8 (6), 630-634.

Rowan & Gram exposed mice to *Schistosoma mansoni* cercariae in water travelling at different velocities in an attempt to estimate the safety of using fast moving water known to contain schistosome cercariae, for bathing, clothes washing or other purposes. Mice were exposed in a specially constructed apparatus in the laboratory, and in a stream known to contain *S. mansoni* cercariae. The velocity of the water in the experiments ranged from 2.7 ml. per second to 50 ml. per second. Samples of water taken at intervals for estimation of cercarial density, revealed a concentration of from 0.35 to 95.4 cercariae per litre. Rowan & Gram found that if the density of the cercariae in the water was constant, mice exposed in fast running water had heavier infections than those in slow water. In addition, the percentage recovery of approaching cercariae as adult worms in mice increased with an increase in the water velocity.

D. L. H. Robinson

**1512**—SLEDGE, E. B., 1959. [State Plant Board Laboratory, Winter Haven, Florida, U.S.A.] "The extrusion of saliva from the stylet of the spiral nematode, *Helicotylenchus nanmus*." **Nematologica**, 4 (4), 356.

This scientific note describes how Sledge observed a female *Helicotylenchus nanmus* feeding on a root hair cell of *Zea mays* growing in water agar. The nematode repeatedly thrust its stylet perpendicularly against the cell wall. During an interval in thrusting, a small globule appeared to enter the cell close to the stylet tip. It appeared light green and more viscous than the cell protoplasm. It enlarged, moved away from the stylet tip, broke up into small globules and disappeared. The oesophageal bulb began to pulsate about 15 mins. after the first appearance of the globule, continued for an undetermined period and the nematode then became quiescent.

M. T. Franklin

- 1513—SORESCO, A. & PANAITESCO, D., 1957. "Contribution à l'étude du phénomène d'éclosion des larves contenues par les oeufs d'*Ascaris*." **Archives Roumaines de Pathologie Expérimentale et de Microbiologie**, 16 (3), 415-428. [German and Russian summaries pp. 427-428.]

Mature, embryonated *Ascaris suum* eggs were placed in different media and different conditions for hatching. During these experiments it was found that: (i) eggs hatched rapidly (10 to 15 minutes or within one hour) when placed in an irritant medium; in this both the time of survival of larvae and the percentage of hatchings were much less than when hatching took place slowly; (ii) hatching took place slowly in physiological saline; (iii) morphological aspects of both types of hatching were similar; (iv) pressing with a pin on the cover slip induced spontaneous hatching; (v) spontaneous hatching was observed about 24 hours after the surrounding temperature was rapidly changed from 20°C.-24°C. to 37°C. It is concluded that the following factors intervene in spontaneous hatching of *Ascaris* larvae: (i) sudden increase of temperature; (ii) pressure exercised on the egg; and (iii) modification of the chemical composition of the medium. The authors describe the morphology of the hatched larvae.

N. Jones

- 1514—STANLEY, N. C. J., 1959. [Iowa State University of Science and Technology.] "Effects of X-irradiation on adults and larvae of *Hymenolepis nana* (von Siebold, 1852) Blanchard, 1892 (Cestoda: Cyclophyllidae)." **Dissertation Abstracts**, 20 (6), 2456.

- 1515—VOGE, M., 1959. [Department of Infectious Diseases, School of Medicine, University of California, Los Angeles, U.S.A.] "Temperature stress and development of *Hymenolepis diminuta* in *Tribolium confusum* on different diets." **Journal of Parasitology**, 45 (6), 591-596.

The influence of host diet has been studied in the presence of temperature stress on the development of *Hymenolepis diminuta* cysticercoids in *Tribolium confusum*. The exposure of the *Tribolium* adults to temperatures of 38.5°C. from days three to five of cysticercoid development produces a high number of abnormals. This can be reduced by feeding the *Tribolium* on saturated pure sugar solutions and can be modified by the addition of water to the flour diet. Saturated aqueous solutions of glucose, fructose, galactose, maltose, sucrose, arabinose or raffinose produced one-third or less abnormals as compared with two-thirds or more abnormals when the *Tribolium* was fed on flour. The infectivity of the cysticercoids to rats was markedly increased by feeding sugars dry or in solution.

K. Heath

- 1516—WALLACE, H. R., 1959. [Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, England.] "Further observations on some factors influencing the emergence of larvae from cysts of the beet eelworm *Heterodera schachtii* Schmidt." **Nematologica**, 4 (4), 245-252. [German summary p. 251.]

The form of the emergence curve of larvae from beet eelworm cysts in sand at controlled moisture content is similar to that in watchglasses. There is an optimum pressure deficiency in sand for emergence which is related to particle size, the smaller the particle size the higher the optimum suction. There does not appear to be a limiting pressure deficiency for emergence as has been suggested previously. At the optimum pressure deficiency the rate of larval emergence decreases with particle size. It is suggested that as larval emergence progresses there is an accumulation of carbon dioxide which inhibits further hatch and emergence. Emergence from cysts and movement through soil pores are fundamentally the same phenomenon and are subject to the same factors influencing locomotion. A hypothesis is put forward to show how emergence is influenced by the soil environment.

H. R. Wallace

- \*1517—WANG, C. F., LIN, C. L. & CH'EN, W. H., 1959. [Some problems on the mechanism of microfilarial periodicity.] **Chinese Journal of Internal Medicine**, 7 (3), 245-247. [In Chinese: English summary pp. 22-23.]

[A fuller account of this paper has already been published in **Chin. med. J. Peking**, 1958, 77, 129-135. For abstract see **Helm. Abs.**, 27, No. 222h.]



## Pathogenesis

See also Nos.: 997, 998, 1002, 1006, 1015, 1016, 1020, 1024, 1025, 1029, 1031, 1034, 1040, 1041, 1047, 1050, 1056, 1068, 1071, 1073, 1077, 1078, 1080, 1100, 1107, 1115, 1118, 1122, 1126, 1131, 1141, 1145, 1148, 1158, 1167, 1188, 1197, 1200, 1211, 1221, 1231, 1244, 1263, 1265, 1269, 1274, 1277, 1279, 1280, 1281, 1283, 1284, 1286, 1287, 1300, 1302, 1305, 1306, 1347, 1351, 1380, 1480, 1504.

**1518**—BASSETT, L. W., 1957. [University of California, Los Angeles, U.S.A.] "Brewer blackbird gall bladder infestation with *Conspicuum icteridorum* (Trematoda) and the histopathology observed." [Abstract of paper presented at the 54th Annual Meeting of the American Society of Zoologists, August 26–29, 1957.] **Anatomical Record**, **128** (3), 521.

[A fuller account of this work appears in **J. Parasit.**, **44**, 471–476. For abstract see **Helm. Abs.**, **27**, No. 247dz.]

**1519**—BJÖRKENHEIM, G., 1957. [IVth Medical Clinic, Maria Hospital, Helsingfors.] "Neurotropic factors in the fish tapeworm." **Acta Medica Scandinavica**, **159** (6), 433–437.

Extract of *Diphyllobothrium latum* was observed to have a marked neurotropic effect in clinical tests in three cases of pernicious anaemia. It is suggested that neural degeneration is caused by the parasite by absorbing neurotropic factors from the intestinal contents. The author goes on to discuss the vitamin B<sub>12</sub>-like effect of these factors. N. Jones

**1520**—BOURGEON, R., PIETRI, H., MUSSINI-MONTPPELLIER, J. & GUNTZ, M., 1957. "Documents concernant les cirrhoses hydatiques. (Une observation de cirrhose globale et d'autres relatives à des hépatites scléreuses en secteur)." **Afrique Française Chirurgicale**, **15** (2), 135–145.

Bourgeon *et al.* report on hydatid cirrhosis from their own experience. They describe and illustrate in detail clinical and anatomo-pathological aspects of the infection. N. Jones

**1521**—BROEK, E. VAN DEN & WENSVOORT, P., 1959. [Utrecht, Instit. v. Veterin. Parasit., Bilstraat 172, Holland.] "On parasites of seals from the Dutch coastal waters and their pathogenicity." **Säugetierkundliche Mitteilungen**, **7** (2), 58–61.

The authors report the findings on post-mortem examinations of 25 harbour seals (*Phoca vitulina*) from Dutch coastal waters. In all cases the lungs, in 14 cases the alimentary canal and in two cases the skin were examined. In the alimentary canal *Porrocaecum decipiens* (Krabbe, 1878), *Contracaecum osculatum* (Rudolphi, 1802), *Cryptocotyle lingua* (Creplin, 1825), *Diphyllobothrium* sp. and some unidentified heterophyid trematodes were found. In the lungs and heart *Otostrongylus circumlitus* (Railliet, 1899), *Paraflaroides gymmurus* (Railliet, 1899) and *Skrjabinaria spirocauda* (Leidy, 1858) were found. No gastro-intestinal disturbances were observed. Considerable pathological changes were present in the lung and bronchial tissue and thought to be attributable to the presence of lung parasites but no conclusions are reached as to whether or no the parasites are the primary cause. W. M. Fitzsimmons

**\*1522**—CHIANG, S. H. ET AL., 1959. [Roentgenological and pathological studies of the lungs of rabbits experimentally infected with *Schistosoma japonicum*.] **Chinese Journal of Radiology**, **7** (2), 81–89. [In Chinese.]

In a first series of experiments on rabbits infected with *Schistosoma japonicum* (from cercarial infection to maturation of adults) lesions seen by X-ray were insignificant and the pathologic changes were transient. In a second series (oviposition) ova-nodules were seen histologically in most animals, whilst in X-ray they were seen as nodular or diffuse miliary forms. Chiang *et al.* believe that pulmonary lesions began with emboli in arterioles caused by immature ova, leading to pseudotubercles which were absorbed by lymphocytes. Fibrous formation of pseudotubercles was rarely complete and calcified ova few in number. [Taken from an abstract in **Chin. med. J. Peking**, **78** (6), 591.] N. A. Hancock

- 1523—COUTINHO-ABATH, E. & JAMPOLSKY, R., 1957. [Instituto Nacional de Endemias Rurais do D.N.E.Ru. Centro de Pesquisas Aggeu Magalhães, Recife, Pe., Brazil.] "Comportamento das cercárias de *Schistosoma mansoni* na infestação experimental de animais refratários. I. Histopatologia das reações cutâneas observadas no pombo doméstico (*Columba livia domestica*)."  
**Anais da Sociedade de Biologia de Pernambuco**, 15 (1), 93–125. [English summary pp. 104–105.]

Coutinho-Abath & Jampolsky describe the histopathology of the skin reaction of the domestic pigeon to penetration by cercariae of *Schistosoma mansoni*. Birds were held with their feet and legs in water containing the cercariae and skin biopsies were made at intervals varying from eight minutes to 888 hours after exposure. Cercariae which failed to penetrate beyond the stratum corneum did not cause any inflammatory reaction and were shed during normal desquamation. Those which reached the Malpighian layer caused an inflammatory reaction resulting in the formation of a cyst which eventually ruptured to the exterior. Those which penetrated to the dermis caused an inflammatory reaction and became surrounded by polymorphs and eosinophils before becoming resorbed by macrophage action. C. A. Wright

- 1524—DIACONITA, G. & NAGY, P., 1957. [Anatomical-pathological Laboratory, Nampho Hospital, Korea.] "Contributions to the study of intrarachidian localisation of *Distoma* (paragonimiasis)."  
**Acta Medica Scandinavica**, 159 (2), 151–154.

A case of intra-rachidian paragonimiasis is described and histo-pathological changes illustrated with photomicrographs. It is concluded that under endemic conditions the possibility of intra-rachidian paragonimiasis must be considered in the presence of a syndrome of medullary compression. N. Jones

- 1525—DIACONITA, G., GOLDIS, G. & NAGY, P., 1957. [Anatomical-pathological Laboratory, Nampho Hospital, Korea.] "Researches on histogenesis and anatomico-pathological forms of cerebral distomatosis (paragonimiasis)."  
**Acta Medica Scandinavica**, 159 (2), 155–166.

Ten cases of cerebral paragonimiasis are described and richly illustrated with photomicrographs. From the study of histogenesis and anatomo-pathological changes the authors draw numerous conclusions [which do not lend themselves to abstraction]. N. Jones

- 1526—FEKETE, I. & KULCSÁR-GERGELY, J., 1959. [Zoologisches Institut, Kossuth-Lajos Universität, Debrecen, Hungary.] "Über die geschwulstfördernde Wirkung des *Ascaris*-Eihomogenisats mit Berücksichtigung der hormonalen Verhältnisse der Tiere."  
**Naturwissenschaften**, 46 (10), 362.

Preliminary treatment of castrated and normal rats with *Ascaris* egg homogenate made possible insemination of young rats with Guérin tumours and accelerated tumour development in sexually mature animals. Changes were also observed in the oestrous cycle and in the sexual hormone levels. The significance of the observed phenomena is discussed. J. M. Watson

- 1527—GERWEL, C., 1958. "Robaczycza jako problem zdrowia publicznego na wsi." **Polski Tygodnik Lekarski**, 13 (47), 1871–1873.

Gerwel discusses pathogenicity in general and the distribution of *Ascaris lumbricoides*, *Trichuris trichiura*, *Enterobius vermicularis*, *Taenia saginata* and *T. solium* infections in Poland. In the author's view prophylaxis is of primary importance. Further he makes some suggestions as to the control of helminthiasis in rural areas. N. Jones

- 1528—GORLIN, R. J., BARRON, C. N., CHAUDHRY, A. P. & CLARK, J. J., 1959. [Department of Oral Pathology, School of Dentistry, University of Minnesota, Minneapolis, U.S.A.] "The oral and pharyngeal pathology of domestic animals. A study of 487 cases." **American Journal of Veterinary Research**, 20 (79), 1032–1061.

The only helminthic lesion in this series was due to encysted larvae of *Trichinella spiralis* in the tongue of a dog which did not differ significantly from such lesions in other animals. G. Lapage

- 1529—GRATAMA, S., 1957. [Firestone Plantation Hospital, Cavalla, Liberia.] "Acute necrosis of the scrotal skin." **Documenta de Medicina Geographica et Tropica**, 9 (3), 280.

This is stated to be the fourth case of this kind observed within two years in this area where infections with *Wuchereria bancrofti*, *Acanthocheilonema perstans* and *Onchocera volvulus* are common. It is suggested that these lesions are of filarial origin, blood smears in the present case being positive for microfilariae [species not stated]. J. M. Watson



**1530**—LEE, C. L., 1957. [Department of Biology, Peking University, China.] [Observations on giant cells induced in tomato roots by *Meloidogyne hapla*.] *Acta Botanica Sinica*, **6** (3), 194–200. [In Chinese; English summary p. 199.]

Lee studied giant cell formation caused by *Meloidogyne hapla* in tomato. In the early stages some coalescence of cells occurred. There was also enlargement of individual cells associated with multiple divisions and fusions of nuclei. Later nuclear divisions were irregular. Non-lignified secondary thickening of cell walls with simple pitting sometimes took place.

M. T. Franklin

**1531**—LEI, H. H. & YEN, C. K., 1957. [Department of Pathology, Shanghai First Medical College, Shanghai.] "Pathologic changes of paragonimiasis. A report of five cases." *Chinese Medical Journal. Peking*, **75** (12), 986–1003.

Clinical symptoms and pathological changes observed in five cases of human paragonimiasis are described. Emetine, chloroquine and diodoquin showed no effect in the treatment. All the patients died two days to one month after operation. Cysts, in some of which eggs or adult worms were identified, were found in the omentum, mesentery, lungs, liver, brain, pleura, peritoneum, spleen, peri-renal tissue, kidney, urinary bladder, adrenal, and extradural space of the spinal cord. The migration route of the larval flukes towards the brain and the migration of adult worms in the brain are discussed.

N. Jones

**1532**—LIU, Y. F., TENG, C. L. & LIU, K., 1957. "Cerebral cysticercosis as a factor aggravating Japanese B encephalitis." *Chinese Medical Journal. Peking*, **75** (12), 1010–1017.

In 30.8% of 26 cases of Japanese B encephalitis *Cysticercus cellulosae* was found in the brain. In seven the parasite was localized only in one side of the brain. In 245 post-mortem cases with diseases other than encephalitis only one case of cysticerciasis was found. It is concluded that cerebral cysticerciasis facilitates infection with Japanese B encephalitis. The possibility of predisposition to this virus disease, due to other helminths, is also discussed, as among the 26 cases of encephalitis there were 15 cases of *Ascaris*, two of *Taenia solium* and two of *Enterobius vermicularis* infection.

N. Jones

**1533**—MOUNTAIN, W. B., 1957. [Science Service Laboratory, Harrow, Canada.] "Pathogenicity of nematodes in relation to Koch's postulates." *Proceedings of the S-19 Workshop in Phytoneematology, University of Tennessee*, July 1–6, 1957, 8 pp.

Mountain expresses concern at the tenuous evidence on which many nematodes are regarded as plant pathogens. Koch's postulates are not applicable in practice to all problems in plant pathology as it is, as yet, impossible to culture many suspected pathogens axenically. Nevertheless we should try to define the role of the suspected organism more exactly. To this end Mountain proposes that a nematode associated with a plant disease should be regarded as a *parasite* if and only if it is patently feeding and reproducing on the living plant tissues; as an *aggravator* if, through its toxic metabolites, it predisposes otherwise healthy plant cells to invasion by a pathogen; as a *vector* if it merely transports a pathogen; as an *incitant* if it initiates the development of a disease in which other organisms are directly involved; as a *pathogen* if it causes the disease in the absence of all other suspected organisms.

R. D. Winslow

**1534**—RIBELIN, W. E. & BAILEY, W. S., 1958. [Department of Pathology & Parasitology, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., U.S.A.] "Eosophageal sarcomas associated with *Spirocerca lupi* in the dog." *Cancer. Philadelphia*, **11** (6), 1242–1246.

Autopsies were performed on 1,969 dogs aged six months of age or older and thus old enough to show *Spirocerca lupi* lesions. 163 were positive for infection and of these 16 had oesophageal sarcoma. *S. lupi* were found in or near the neoplasm in seven of these cases. No sarcomata were found in those dogs which had not been infected with the worm, hence Ribelin & Bailey consider that the association of the tumour with *Spirocerca* lesions is statistically significant.

N. A. Hancock

- 1535—SKALINSKI, E. I., 1957. [Toxic action of larvae of *Delafondia vulgaris* on horses.] **Trudi. Gosudarstvenni Nauchno-Kontrolni Institut Veterinarnikh Preparatov**, 7, 310–317. [In Russian.]  
By injecting larval toxin into experimental horses (7 ml. of a 1:5,000 dilution to a mare aged eight years and 5 ml. of a 1:100 dilution to a foal aged 18 months), it was shown that the products of dead *Delafondia vulgaris* larvae released in the horse can produce various gastro-intestinal disorders and symptoms of colic. G. I. Pozniak

- 1536—SKALINSKI, E. I., 1957. [Pathology of experimental and spontaneous *Delafondia vulgaris* infestation in horses.] **Trudi. Gosudarstvenni Nauchno-Kontrolni Institut Veterinarnikh Preparatov**, 7, 318–327. [In Russian.]  
The pathological changes associated with *Delafondia vulgaris* infections in 13 experimentally and 40 naturally infected horses are described and illustrated (by 24 photographs and photomicrographs). The changes appear principally in the circulatory system, the nervous system, the gastro-intestinal tract and parenchymatous organs. G. I. Pozniak

- 1537—TOLOSA, E. & FUENMAYOR, P., 1957. [Neurochirurgische Klinik, Neurologisches Institut, Barcelona, Spain.] “Neurochirurgische Erfahrung über Cysticerken-Epilepsie.” **Acta Neurochirurgica. Vienna**, 5 (2/5), 371–384. [English, French and Spanish summaries p. 383.]  
Twelve cases of cerebral cysticerciasis with epileptic symptoms as part of the neurological picture, are studied with respect to their diagnosis, the number and position of the cysts and the effect of surgical treatment. Cases with an isolated or almost isolated epileptic syndrome—the characteristic features of four such cases are described—present particularly favourable conditions for curative surgical treatment. G. I. Pozniak

### Immunity

*Abstracts of papers referring to the routine use of immunological techniques in diagnosis or assessment of cure will be found under the appropriate headings in the sections devoted to Medical Helminthology and Veterinary Helminthology.*

See also Nos.: 1024, 1231, 1261, 1267, 1270, 1272, 1273, 1278, 1291, 1298, 1299, 1301, 1304, 1307, 1308, 1421, 1422, 1425, 1444, 1465, 1489, 1576.

- 1538—ARAKI, M., 1959. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka.] [Immunological studies of *Paragonimus ohirai* Miyazaki, 1939.] **Fukuoka Acta Medica**, 50 (7), 2180–2208. [In Japanese: English summary pp. 2180–2181.]  
The allergic phenomena induced by *Paragonimus ohirai* infection were studied in guinea-pigs, rabbits and man. Schwartzman's type reaction in the skin of guinea-pigs was demonstrated, using the worm cyst contents of *P. ohirai* as a preparatory and/or a provocative factor, the latter being 100 to 200 units and the former 2 to 3 units. Cross-Ogata's inhibitory effect was demonstrated by inoculating guinea-pigs intravenously with worm extract one hour before the preparatory injection during Schwartzman's test, using substances obtained from *P. ohirai*. Arthus' phenomenon was demonstrated in rabbits, using the whole body extract as well as the worm cyst contents of *P. ohirai*. Effective substances to develop Schwartzman's reaction in guinea-pigs and Arthus' phenomenon in rabbits were contained mainly in a crude fraction of protein in the whole body extract or the worm cyst contents of *P. ohirai*. Species specific antigencity of *P. ohirai* and *P. westermani* was suggested by the observed results of Arthus' phenomenon and Prausnitz-Küstner's phenomenon, which showed somewhat different reactions to each antigen obtained from the two species. Y. Yamao



- 1539—ASHIDA, H., 1959. [Department of Pathology, Faculty of Medicine, University of Tokushima, Tokushima, Japan.] [Immunological studies on *Clonorchis sinensis*.] *Shikoku Acta Medica*, 15 (4), 1004–1023. [In Japanese: English summary pp. 1004–1005.]

When rabbits were infected with *Clonorchis sinensis*, the antigen value rose to 1:1,600 to 3,200 in about 20 days, and remained so thereafter, while the increase of the antibody value was gradual and reached its highest value of 1:32 to 64 in 50 to 70 days, retaining its peak value thereafter. Precipitation reactions were carried out between the antigen from *Paragonimus westermani* and adult canine filaria, and the serum of the rabbits infected with the liver-flukes. Sometimes a positive reaction was observed with the antigen from *P. westermani*, although its titre was low compared with that of the antigen from the liver-flukes. The same positive precipitation reaction was also observed between the antigen of the liver-flukes and the serum of paragonimiasis patients. A liver-fluke infection of rabbits was treated with stibnal (sodium antimony tartrate), and a considerable decrease in the antibody value was noted, although no marked changes were seen in the antigen value. Efficacy of chemotherapeutic agents against the liver-flukes might well be evaluated on the basis of the antibody value changes.

Y. Yamao

- 1540—CHU, S. H., SHEN, C. H., CH'EN, S. H. & CHENG, S. C., 1959. [Chung Shan Medical College.] "Adult hookworm antigen and its value in the intradermal test for ancylostomiasis." [Abstract.] *Chinese Medical Journal. Peking*, 78 (3), 267.

Chu *et al.* prepared their hookworm antigen as follows: fresh adult hookworms [species not stated] were thoroughly washed with sterile normal saline, ground to a pulp and dried at 45 to 56°C. for two hours. This powder was digested with 1% pancreatin (in physiological saline) one part to 50 (dry weight) at 37°C. for four days. After being centrifuged, the supernatant fluid was precipitated with five volumes of 95% ethyl alcohol. The resultant white powder was dried at 37°C. and extracted with 1:10,000 merthiolate (in physiological saline) one part to 200 (dry weight), in a 56°C. water bath for one hour and then at room temperature for 24 hours. The stock antigen, in the concentration of 0.5%, was diluted 1:16,000 after Seitz filtration and testing for sterility. Surveys using it [methods not described] showed 98.19% positive rate in endemic areas and 2.19% in non-endemic areas. Stool examinations of the former group showed 80.95% positive. No cross reaction occurred with other helminth infections.

N. A. Hancock

- 1541—CHU, S. H., SHEN, C. H., CH'EN, S. H. & CHENG, H. C., 1959. [Chung Shan Medical College.] "Hookworm larvae antigen and its value as a skin test." [Abstract.] *Chinese Medical Journal. Peking*, 78 (3), 267–268.

Hookworm larvae [species not stated] were cultivated from ova in a watch glass supported by a tripod in a petri dish for eight days at 30 to 77°C. After vacuum desiccation the larvae were extracted with 1:10,000 merthiolate in saline at a concentration of 40,000 larvae per ml. in a 56°C. water-bath for one hour and at room temperature for 24 hours. A concentration of 10,000 larvae per ml. was used for the test [methods not detailed]. In endemic and non-endemic areas, 99.55% and 1.90% respectively gave positive results. No cross reactions with other helminths occurred.

N. A. Hancock

- 1542—GÜRALP, N., 1958. "Paraziter hastalıklarda muafiyet." *Türk Veteriner Hekimleri Derneği Dergisi*, 28 (138/139), 11–17.

Immunity to parasitic disease in man and animals is discussed. Types of immunity with some examples are given.

T. Öden

- 1543—LIN, S. S. & SADUN, E. H., 1959. [406th Medical General Laboratory, APO 343, San Francisco, California, U.S.A.] "Studies on the host parasite relationships to *Schistosoma japonicum*. V. Reactions in the skin, lungs and liver of normal and immune animals following infection with *Schistosoma japonicum*." *Journal of Parasitology*, 45 (5), 549–559.

Lin & Sadun studied cellular changes in the skin, lungs and liver of normal and immune monkeys, rabbits and mice after infection with *Schistosoma japonicum* and found essentially

similar changes in all these hosts. Initially there was a very mild diffuse cellular reaction in the skin of normal animals, in which the parasites reached the lungs 16 hours after exposure to infection; but in hosts infected two months previously there was an intense cellular reaction in the epidermis and subcutaneous tissue a few hours after penetration of the cercariae and the migration of the schistosomula was slowed down, some being trapped in the skin, while others reached the lungs two days after infection and here most of them seemed to be surrounded and blocked by diffuse nodules in which they remained alive for long periods; they were still in the lungs 28 days after infection. Photographs illustrate the reactions caused. Among parasites that escaped from the lungs, some, found in the liver, seemed stunted and sexually underdeveloped. Several were dead and infiltrated with phagocytes. The authors could not decide whether the cells slowed down and stopped the schistosomula or whether there was any antibody reaction; they saw no precipitates around the worms, but conclude that both cellular and humoral reactions take part in the immunity.

G. Lapeyre

- 1544—MAGALHÃES, A. E. DE A., 1957. [Departamento de Parasitologia, Faculdade de Medicina de Ribeirão Preto (São Paulo).] "Reação de fixação do complemento para cisticercose no líquido cefalorraquidiano. Emprego de novo antígeno por método quantitativo." *Arquivos de Neuro-Psiquiatria*, São Paulo, 15 (3), 183-189. [English summary pp. 188-189.]

Almeida Magalhães describes the preparation of an antigen for complement fixation tests for cysticerciasis of the central nervous system. The antigen is prepared from *Cysticercus cellulosae* from pigs. The cysticerci are washed several times in saline, dried on filter paper, extracted with benzene for three periods of 24 hours, dried for six hours in an oven, then in a vacuum, ground up and extracted for 25 days in absolute methyl alcohol, centrifuged at 10,000 g. at 3°C. to 6°C. for 15 minutes and the supernatant fluid (the antigen) is decanted and stored in the refrigerator at 4°C. to 6°C. Complement fixation reactions using this antigen and cerebrospinal fluid were carried out on a number of patients whose case histories are presented and it is concluded that this antigen provides a valuable aid to the diagnosis of human cerebral cysticerciasis.

C. A. Wright

- 1545—MAGLAJLIĆ, E., OŽEGOVIĆ, L. & TURANČIĆ, V., 1959. [Clinic for Internal Diseases of Domestic Animals of the Veterinary Faculty, University of Sarajevo.] "Labilitetni pokusi serumskih bjelančevina i protrombinsko vrijeme kod distomatoze goveda." *Veterinaria*, Sarajevo, 8 (2), 229-233. [English summary p. 229.]

Maglajlić *et al.* examined the sera of 93 cattle affected by liver-fluke. The results obtained by lability reactions and Quick's prothrombin time were compared with those of proteins obtained by paper electrophoresis. With the characteristic increase of  $\gamma$ -globulins Weltmann's coagulation column was shifted to the right, the cadmium test was positive and a prolonged prothrombin time was obtained. The most pronounced correlations existed in individual cases between the  $\gamma$ -globulins and the lability reactions.

N. Jones

- 1546—McCULLOUGH, F. S., 1959. [W.H.O. Regional Office for Africa, Brazzaville, French Equatorial Africa.] "The susceptibility and resistance of *Bulinus* (*Physopsis*) *globosus* and *Bulinus* (*Bulinus*) *truncatus* rohlfsi to two strains of *Schistosoma haematobium* in Ghana." *Bulletin of the World Health Organization*, 20 (1), 75-85.

McCullough has carried out experiments designed to test the cross-susceptibility of two strains of *Schistosoma haematobium* and their respective snail intermediate hosts from two localities in Ghana. His results indicate that under more or less normal conditions the strain of the parasite that uses *Bulinus truncatus* as intermediate host will not develop in *B. globosus* and that the reverse is also true. However, under extremely concentrated conditions of exposure to miracidia (about 2,000 larvae to 15 or 20 snails) a slight breakdown of this cross-immunity was observed.

C. A. Wright



- 1547—NORMAN, L. & SADUN, E. H., 1959. [Communicable Disease Center, Public Health Service, U.S. Department of Health, Education and Welfare, Atlanta, Georgia.] "The use of metabolic antigens in the flocculation tests for the serologic diagnosis of trichinosis." *Journal of Parasitology*, **45** (5), 485–489.

Norman & Sadun compare metabolic and somatic antigens of larvae of *Trichinella spiralis* by means of flocculation tests with sera from a variety of animals. The metabolic antigen was more sensitive when tested with sera from men with proven or highly suggestive trichinosis. With sera from experimentally infected pigs the antigens showed equal sensitivity. Both antigens were tested with sera from 163 wild animals which were infected with helminths other than *T. spiralis*; 156 gave negative reactions. Experiments in which the absorption of rabbit serum antibodies by metabolic and somatic antigens were attempted suggested that specific reacting substances were present in the two antigens.

W. P. Rogers

- 1548—OLSON, L. J., 1959. [University of Texas, Medical Branch, Galveston.] "The cellular response of white rats to *Litomosoides carinii* larvae as influenced by cortisone, age, and previous infection." *Journal of Parasitology*, **45** (5), 519–532.

A comparison has been made between the response of Wistar albino rats and cotton-rats to *Litomosoides carinii* infection. Mature albino rats were shown to have developed an age resistance which was illustrated by a decrease in the percentage of larvae completing migration to the pleural cavities and by an increase in the encapsulation of the larvae in the pleural cavities. Albino rats which had been immunized by a previous infection showed a decrease in the percentage of larvae recovered from a challenging infection and an increase in the percentage of encapsulation. It was shown that this immunization was most effective in mature rats and thus appeared to enhance the age resistance in these animals. Administration of cortisone at 30 mg. per kg. effectively suppressed the encapsulation of the larvae in the pleural cavities and the cellular response but did not increase the percentage of larvae completing migration. The effects of immunization in the Wistar rat could also be suppressed by cortisone. The cellular response was measured by the white cell count in the pleural cavities and was seen as a marked increase in eosinophils while the remainder of the inflammatory cells were monocytic. The response in both hosts was similar.

K. Heath

- 1549—PRATA, A., MEDRADO, J., FIORE, S. & ALESSANDRI, M., 1957. [Ospedale Navale di Salvador, Brazil.] "Specificità della intra-dermoreazione per la diagnosi di schistosomiasi con antigene di verme adulto." *Annali di Medicina Navale e Tropicale. Rome*, **62** (3), 257–262.

Antigen prepared from adult *Schistosoma mansoni*, according to the technique of Mayer & Pifano, was tested on 155 persons not suspected of schistosomiasis. Intradermal reaction was negative in 152 cases, doubtful in one and positive in two cases. None of these three persons showed any symptoms of schistosomiasis but eggs of *Ancylostoma duodenale* were found in the faeces of one of them. The test was repeated immediately on the two positive cases with similar results.

N. Jones

- 1550—SADUN, E. H., BUCK, A. A. & WALTON, B. C., 1959. [406th Medical General Laboratory, APO 343, San Francisco, California, U.S.A.] "The diagnosis of paragonimiasis *westermani* using purified antigens in intradermal and complement fixation tests." *Military Medicine*, **124** (3), 187–195.

Sadun *et al.* performed the intradermal test for *Paragonimus westermani* infection on over 2,000 human volunteers using an acid-soluble protein fraction as antigen. Positive results were obtained in the case of all persons suffering from proven infection. Only moderate cross reactions with related trematode infections were observed. The complement fixation test, performed with sera from human beings and experimentally infected animals, using an acid-insoluble, alkali-soluble protein fraction of the adult worms as antigen, showed such a high degree of specificity that it is recommended as a laboratory aid for the diagnosis of early or atypical extra-pulmonary cases and in the evaluation of the results of therapy. J. M. Watson

- 1551—SADUN, E. H. & LIN, S. S., 1959. [406th Medical General Laboratory, APO 343, San Francisco, California, U.S.A.] "Studies on the host parasite relationships to *Schistosoma japonicum*. IV. Resistance acquired by infection, by vaccination and by the injection of immune serum, in monkeys, rabbits and mice." *Journal of Parasitology*, **45** (5), 543-548.

Sadun & Lin infected adult white mice and *Macaca irus* two to four years old with cercariae from crushed snails and used three antigens, the preparation of which is described. They concluded that monkeys, rabbits and mice develop acquired resistance to *Schistosoma japonicum* after previous infection with it and that this resistance is shown by reduction in the size and number of the developing worms, although no difference in the sex ratio of the worms was noted. They also succeeded in producing resistance in mice with both worm extracts and worm metabolites and the injection of immune sera from rabbits conferred a certain degree of resistance to the growth and development of the parasites. Resistance conferred by the injection of antigens and by passive transfer of serum was less marked when the animals had been previously infected, a result that was expected because there is, in experimental infections, a continuous production of antibodies. These results support evidence already available that hosts develop acquired resistance to *S. japonicum* and that this resistance is at any rate partly serological. The authors are studying the relative parts played by cellular and humoral reactions. Their results conflict with those of Vogel & Minning [for abstract see *Helm. Abs.*, **22**, No. 709a] who failed to produce resistance in animals given worm extracts and sera from infected hosts.

G. Lapage

- 1552—SLEEMAN, H. K., 1960. [Department of Serology, Division of Communicable Disease, Walter Reed Army Institute of Research, Washington 12, D.C.] "Isolation and study of a specific complement fixing antigen from adult *Schistosoma mansoni*." *American Journal of Tropical Medicine and Hygiene*, **9** (1), 11-17.

Sleeman used ether-saline, Coca's solution and sodium desoxycholate solution to extract antigen from adult *Schistosoma mansoni* and compared their specificity for schistosomes in the complement fixation test. Of the methods used, extraction with the desoxycholate solution followed by fractionation with ethanol and precipitation with calcium, which eliminated the non-specific substances, produced the antigen with the highest specificity for schistosomes. From chemical analyses of basic components the antigen was found to have a lipoprotein structure, and nitrogen and phosphorous analyses revealed a ratio of protein to lipid of approximately 2.5 to 1. For full details of the techniques used the original paper should be consulted.

D. L. H. Robinson

- 1553—SMITHERS, S. R., 1960. [National Institute for Medical Research, Mill Hill, Middlesex, U.K.] "Gel-diffusion studies on *Schistosoma mansoni*." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **54** (1), 8.

Antigens were prepared as aqueous extracts of crushed, freeze-dried cercariae, eggs, and adult males and females of *Schistosoma mansoni*. Sera from infected Rhesus monkeys were allowed to diffuse towards these antigens, using the Ouchterlony method. Egg extract was the most antigenic, then that of cercariae, and adult extract the weakest. Precipitation lines appeared six weeks after infection with all extracts, and after four weeks with egg extract against one specimen of monkey serum. Cercarial extract showed the greatest persistence. Results of tests on "reaction of identity" suggest that antibody response of different monkeys to similar infection may not be identical.

N. A. Hancock

- 1554—SO, N., 1959. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [Immunological studies of the lung-fluke, *Paragonimus ohirai* Miyazaki, 1939. Precipitin ring test and Sarles' phenomenon.] *Fukuoka Acta Medica*, **50** (8), 2594-2623. [In Japanese: English summary pp. 2594-2595.]

Precipitation titre against *Paragonimus ohirai* was highest in rabbits with experimental paragonimiasis, followed by rabbits which had been inoculated with worm extracts, and was



lowest in dogs with experimental paragonimiasis. Precipitation reaction and Sarles' phenomenon became positive almost at the same time during the early stage of infection. Pre-treatment of rabbits with worm extracts did not protect them from *Paragonimus* infection although Sarles' phenomenon was decreased, which seemed to indicate that the infecting larvae could have been affected by the worm extract treatment. The serum of patients with *Paragonimus* eggs in the sputum showed a precipitation titre of 1:800 to 1:1,600 and strongly positive Sarles' phenomenon. When patients were treated for paragonimiasis and sputa became negative for worm eggs, the longer the time elapsed after the treatment, the weaker were Sarles' phenomenon and precipitation titre, the former showing the earlier decrease. Antigens obtained from *P. ohirai* and *P. westermani* showed no particular difference in the precipitation reaction and Sarles' phenomenon. These two reactions were closely correlated with the activities of the worm in the host and were expected to be useful in early diagnosis as well as in determining effectiveness of chemotherapy.

Y. Yamao

### Anthelmintics

See also Nos.: 991, 993, 994, 995, 1001, 1003, 1005, 1006, 1007, 1014, 1022, 1028, 1029, 1032, 1035, 1039, 1049, 1058, 1060, 1062, 1063, 1064, 1065, 1066, 1069, 1079, 1080, 1094, 1096, 1100, 1101, 1107, 1110, 1112, 1113, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1129, 1130, 1140, 1144, 1146, 1151, 1153, 1155, 1158, 1161, 1162, 1165, 1167, 1170, 1171, 1172, 1174, 1176, 1178, 1179, 1183, 1184, 1185, 1186, 1193, 1195, 1202, 1205, 1210, 1213, 1214, 1215, 1216, 1219, 1220, 1222, 1223, 1224, 1225, 1226, 1231, 1385, 1412, 1502, 1503, 1531, 1566.

**1555**—BARKE, A., 1958. [Hannover, Kniggestrasse 3.] "Piperazin als Anthelminthikum in der Tierheilkunde." **Praktische Tierarzt (Der)**, Year 1958, No. 6, pp. 173-176.

Barke quotes an extensive literature on the history, chemistry and use of piperazine as an anthelmintic in veterinary medicine.

N. Jones

**1556**—CARLO, V. DI, 1958. [Istituto di Farmacologia e Tossicologia dell'Università di Napoli, Italy.] "Sull'attività antinematodea della tetraciclina." **Acta Medica Italica**, 13 (6), 141-144.

Carlo studied the effect of chlortetracycline on some nematodes *in vitro*. Increased motility of *Parascaris equorum* and *A. suum* was observed at 1:100,000 concentration in Ringer-Locke solution; it could be described as convulsive at concentrations ranging from 1:10,000 to 1:1,000. At the highest concentration increased motility lasted for about two hours after which the nematodes hardly reacted to mechanical stimuli. Twenty-four hours after the beginning of the experiment all the worms were placed in Ringer-Locke solution. During the following 48 hours no difference was observed between the behaviour of the treated and control nematodes. A similar experiment with *Turbatrix aceti* showed that chlortetracycline, added to the vinegar at concentrations ranging from 1:1,000 to 1:8,000 inhibited to a large extent the reproduction of this nematode.

N. Jones

**1557**—CASTEL, P. & GRAS, G., 1959. [Laboratoire de Pharmacie chimique, Faculté de Pharmacie, Montpellier, Hérault, France.] "Les possibilités anthelminthiques de l'arséniate d'étain. Note préliminaire." **Revue de Pathologie Générale et de Physiologie Clinique**, 59 (706), 327-330.

Castel & Gras give a preliminary report on the anthelmintic efficacy of tin arsenate as compared with lead arsenate, using white mice infected with 200 eggs of *Hymenolepis fraterna* each. In three groups of mice which received (i) 40 mg. per kg. body-weight, (ii) 100 mg. per kg., or (iii) two doses of 100 mg. per kg., the respective cure rates were 26%, 42% and 75%. In two groups of mice which each received 100 mg. of tin arsenate per kg., once in the first group and twice on two successive days in the second group, the respective cure rates were 80% and 100%. Both drugs were administered *per os* in the form of suspension.

N. Jones

\*1558—CH'EN, K. C., 1959. [1-bromo-2-naphthol in hookworm disease: observations of 212 cases.] **Chinese Journal of Internal Medicine**, 7 (3), 250-252. [In Chinese: English summary pp. 23-24.]

4 gm. of the drug were given orally in the fasting state for three days, without cathartics. Worms were expelled in the faeces of 64 out of 73 cases examined by Stoll's method, both *Ancylostoma duodenale* and *Necator americanus* being present. Two follow-up examinations by smears of 198 cases showed 98 positive and 100 negative (with 19 negative for larvae after stool culture) in the first and 71 positive and 127 negative (35 negative for larvae) in the second. 124 cases showed various mild drug reactions. [Taken from an abstract in **Chin. med. J. Peking**, 78, 386-387.] N. A. Hancock

1559—CH'EN, C. K. ET AL., 1959. [Chekiang Medical College.] "Experimental therapy of paragonimiasis." [Abstract.] **Chinese Medical Journal. Peking**, 78 (3), 273.

14 cats were experimentally infected with metacercariae and 12 of them were variously treated with chloroquine, emetine hydrochloride, or the two drugs combined, two cats acting as controls. The combined drugs seemed to give better results but a higher toxic effect. 12 dogs similarly infected were treated with emetine, menadione sodium bisulphite, the two drugs consecutively or simultaneously. Only results of emetine alone are mentioned and these showed, on autopsy, worm development rates of 38% to 63%. Eight further infected dogs were treated with high doses of emetine, suramin sodium, daraprim, or dilantin sodium. Only the first-named of these drugs showed any effect. N. A. Hancock

1560—GIBSON, T. E., 1957. [Central Veterinary Laboratory, New Haw, Weybridge, Surrey, U.K.] "Piperazine compounds for farm animals." **Agricultural Review. London**, 3 (3), 16-18.

Gibson discusses the use of piperazine compounds against various helminthiasis in farm animals. N. Jones

1561—IIDA, M. ET AL., 1959. [Department of Parasitology, Gifu Prefectural Medical School, Gifu, Japan.] [Effectiveness of 4-iodo-thymol against hookworm.] **Acta Scholae Medicinalis in Gifu**, 7 (3), 855-861. [In Japanese: English summary p. 855.]

0.2 gm. per kg. body-weight of 4-iodo-thymol was administered to an adult dog which harboured *Ancylostoma caninum* and *Trichuris vulpis*. No undesirable side effect was observed, and the dog tolerated the medication. No appreciable decrease in the egg numbers took place. A group of human beings proved infected with *Ancylostoma duodenale* was treated with 4-iodo-thymol, twice a day, 3 gm. at a time, totalling 6 gm. per person. Faecal examination two weeks after treatment by smear, flotation and culture methods, revealed that only three out of twenty-nine persons treated had negative stools. Twelve out of thirty-one persons treated reported no appreciable side effects. Y. Yamao

1562—KELLEY, G. W. & MARSH, C. L., 1960. [Department of Animal Pathology, University of Nebraska, Lincoln, Nebraska.] "Lack of larvacidal action of Ronnel and Bayer 21/199 against migrating *Ascaris suum* in baby pigs." **American Journal of Veterinary Research**, 21 (80), 109-110.

Two organic insecticides which have been used systematically against cattle grubs (*Hypoderma* spp.) and as anthelmintics against the gastro-intestinal nematodes of ruminants were tested against the migrating larvae of *Ascaris suum* in young pigs. 14 two-week-old pigs were infected with 50,000 decoated eggs. On each of five consecutive days five of the pigs were dosed with Ronnel (0,0-dimethyl 0-[2,4,5-trichloro-phenyl] phosphorothioate) at a dose rate of 50 mg. per kg. body-weight; another five pigs were given a similar treatment with Bayer 21/199 (0,0-diethyl 0-[3-chloro-4-methyl-7-coumarinyl] phosphorothioate) at 12.5 mg. per kg. There was no significant effect of either treatment on the migrating larvae. Both drugs showed toxic effects in the reduction of blood cholinesterase by 60% in the case of Ronnel and by 93% in the case of Bayer 21/199. Two of the pigs given Bayer 21/199 died. L. K. Whitten



- 1563**—LEVINE, N. D. & SZANTO, J., 1960. [College of Veterinary Medicine, University of Illinois, Urbana, Illinois.] "The effect of cadmium compounds on *Strongyloides papillosus* in sheep." **American Journal of Veterinary Research**, **21** (80), 84-85.
- Cadmium iodide and cadmium oxide at dose rates of 50 to 100 mg. per kg. body-weight caused a marked reduction in the number of eggs of *Strongyloides papillosus* in the faeces of treated lambs. Cadmium chloride had a similar although less marked effect. At the higher dose rates the eggs were completely eliminated and did not reappear during the subsequent three to four months. In some animals some diarrhoea and loss of weight occurred after treatment but these effects were not serious. L. K. Whitten
- \*1564**—LIEN, M. C., CHANG, T. Y. & LIU, C. C., 1959. [Effects of *Melia azedarach* tablets in the treatment of 115 hospitalized cases of intestinal ascariasis.] **Chinese Journal of Internal Medicine**, **7** (3), 241-244. [In Chinese: English summary p. 22.]
- A dosage of 0.6 gm. to 1.4 gm., given as tablets made from the bark of *Melia azedarach*, produced a worm removal rate of 76.52%. One or two weeks later, 51.43% of faecal samples were negative for ova. Various toxic reactions, including two cases with severe symptoms of intoxication, occurred in 26%. [Taken from an abstract in **Chin. med. J. Peking**, **78**, 385-386.] N. A. Hancock
- 1565**—LIENERT, E., 1959. [Wien III, Linke Bahngasse 11, Austria.] "Auf welchem Wege gelangt Filmaron im Wirsteir zum Leberegel?" **Berliner und Münchener Tierärztliche Wochenschrift**, **72** (23), 463-465. [English summary p. 465.]
- Lienert's experiment is designed to show whether the effect of Filmaron on liver-fluke is obtained via the blood. 48 rats were given a total of 292 liver-flukes by subcutaneous implantation in the renal area. Half of the rats were given orally 195 mg. Filmaron per kg. body-weight, the others acting as controls. After five days 60 (42%) of the liver-flukes were recovered dead from the controls, and 131 (89%) from the treated rats. This showed that, in this experiment, oral Filmaron killed liver-flukes via the blood and not via the bile; it also showed that the flukes did not stop ingesting blood which contained the lethal Filmaron. A. E. Fountain
- 1566**—LU, S. T. & LI, C. C., 1959. [Department of Medicine, Shanghai Hsü Huei Hospital, Shanghai, China.] "Exfoliative dermatitis due to antimony potassium tartrate. A case report." **Chinese Medical Journal. Peking**, **78** (5), 456.
- Lu & Li report in detail the development of unusually severe exfoliative dermatitis in a 48-year-old female schistosomiasis japonica patient who had received 48 mg. per kg. body-weight of antimony potassium tartrate daily for 14 days. Although the antimony treatment was stopped and the patient taken into hospital and given intravenous glucose and saline concurrently with diphenylhydramine and vitamins, her condition greatly deteriorated until ACTH treatment was started. This produced a remarkable improvement and the patient was discharged in good condition two-and-a-half months after admission. This is claimed to be the first report of exfoliative dermatitis due to antimony potassium tartrate. J. M. Watson
- 1567**—MISOCHKIN, A., 1959. [Preparation of phenothiazine-salt briquettes.] [Abstract.] **Veterinariya**, **36** (6), 41. [In Russian.]
- A press adapted for the preparation in the field of briquettes of ten parts fine salt to one part phenothiazine is briefly described. The round 1 kg. briquette must be dried after pressing. G. I. Pozniak
- 1568**—MUTH, O. H., 1960. [Department of Veterinary Medicine, Oregon Agricultural Experiment Station, Oregon State College, Corvallis, Oregon.] "Carbon tetrachloride poisoning of ewes on a low selenium ration." **American Journal of Veterinary Research**, **21** (80), 86-87.
- Two groups of 11 ewes were fed on a ration of oats and ladino clover, the latter having a selenium content of 0.05 p.p.m. One group received a supplement of 0.1 p.p.m. selenium as sodium selenite. The ewes lambed during the experiment, and after weaning (150 days after

the experiment began) both groups were dosed with 1 ml. carbon tetrachloride. All the ewes on the supplement remained normal but all those without supplement showed symptoms of depression and inappetence between 30 and 60 hours after dosing. One ewe died and showed, on autopsy, blood-stained peritoneal fluid and typical lesions of carbon tetrachloride poisoning in the liver—parenchymatous swelling, friability and centrolobular haemorrhage. The wall of the gall-bladder was also oedematous and haemorrhagic.

L. K. Whitten

- 1569—SOH, C. T., 1960. [Department of Parasitology, Severance Medical School, Yon-Sei University, Seoul, Korea.] "The effects of natural food-preservative substances on the development and survival of intestinal helminth eggs and larvae. I. Action on *Ascaris lumbricoides* eggs." **American Journal of Tropical Medicine and Hygiene**, 9 (1), 1-7.

Washed fertile *Ascaris lumbricoides* eggs from fresh stools and eggs which had been cultured to the infective stage were tested against various common substances used in pickling vegetables, either alone or in combination. The tests continued for 40 days and at ten-day intervals samples were examined and tested for viability after placing in clean water for 15 to 20 days. Garlic and mustard were found to have the greatest effect in killing larvae and preventing development of eggs. Boiling the infusions of these substances before use or adding acetic acid reduced their efficacy, and mixtures of the various items used in pickling were no better than garlic or mustard alone. Soh considers that no firm conclusion can be drawn from the results obtained.

N. A. Hancock

- 1570—SOH, C. T., 1960. [Department of Parasitology, Severance Medical School, Yon-Sei University, Seoul, Korea.] "The effects of natural food-preservative substances on the development and survival of intestinal helminth eggs and larvae. II. Action on *Ancylostoma duodenale* larvae." **American Journal of Tropical Medicine and Hygiene**, 9 (1), 8-10.

Freshly collected ova and cultured larvae (all stages) of *Ancylostoma duodenale* were tested against various pickling substances. All such materials were found to be lethal to pre-infective stages but only mustard or garlic killed the infective larvae. These two substances were effective on their own or mixed with other substances, including acetic acid, but boiling before use reduced their toxicity considerably. [See also preceding abstract.]

N. A. Hancock

- 1571—TAYLOR, A. E. R. & TERRY, R. J., 1960. [National Institute for Medical Research, Mill Hill, Middlesex, U.K.] "The effect of antifilarial drugs on the embryonic development of *Litomosoides carinii*, of the cotton-rat." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 54 (1), 33-36.

Various drugs were tested *in vivo* against *Litomosoides carinii* in cotton-rats and *in vitro* in media in flasks. After exposure to the drugs, female worms were examined for development of embryos. Arsenic and antimony compounds destroyed all developmental stages and affected all parts of the cell equally, cyanine 863 affected the nucleus in particular, the bis *iso* quino-  
linium compounds acted mainly on the early embryos and little on mature microfilariae, whilst diethylcarbarnazine had no effect on embryos. Taylor & Terry consider that such sterilization of adult worms would tend to break the link between host and vector in filariasis.

N. A. Hancock

### Economic Aspects

See also Nos.: 1051, 1052, 1150, 1160, 1216, 1340, 1405, 1406, 1408.

- 1572—COSTA, D. & HOLLANDA, H. H. DE, 1958. "Economia e alimentação no nordeste, em áreas de esquistossomose. Dados de um inquérito em dois bairros populares de João Pessoa." **Revista Brasileira de Medicina**, 15 (10), 708-714. [English & French summaries p. 714.]

Costa & Hollanda report on a survey of economic conditions in two districts of João Pessoa, State of Paraíba, which had been the object of a campaign against schistosomiasis. Those conditions, reflected chiefly by the low value of the food consumed, were found to be very poor and likely to facilitate the spread of schistosomiasis.

N. Jones



## History

See also Nos.: 1103, 1104, 1105.

**1573**—ZAKARIA, H., 1959. [Department of Biology, College of Medicine, Baghdad, Iraq.] "Historical study of *Schistosoma haematobium* and its intermediate host, *Bulinus truncatus*, in Central Iraq." **Journal of the Faculty of Medicine of Baghdad**, New series, **1** (1), 2–10.

Zakaria briefly reviews the records of the occurrence of *Schistosoma haematobium* and its intermediate host *Bulinus truncatus* in Iraq. He then reports the finding of sub-fossil shells of *Bulinus* in the mud bricks of a number of ancient buildings in the Tigris-Euphrates valley. The oldest of these is about 6,000 years of age and the author concludes that the presence of these snails may be taken as an indication of the probable existence of urinary schistosomiasis in Iraq for a considerable period of time.

C. A. Wright

## Biography

*No relevant abstracts in this issue*

## Hyperparasitism

See also No. 1455.

**1574**—BARON, R. R., 1959. [Kansas State University.] "The bacterial flora of the roundworm *Ascaridia galli* and its relationship to the host flora." **Dissertation Abstracts**, **20** (6), 2445.

**1575**—DRECHSLER, C., 1959. [Crops Research Division, Agricultural Research Service, United States Department of Agriculture.] "Two new species of *Harposporium* parasitic on nematodes." **Journal of the Washington Academy of Sciences**, **49** (4), 106–112.

Drechsler describes two new species of *Harposporium*, one attacking *Plectus* sp., the other probably *Panagrobelus* sp.

J. B. Goodey

**1576**—JADIN, J. & GIROUD, P., 1959. [Institut Pasteur, Service des Rickettsioses.] "Présence des néo-rickettsies dans les tissus larvaires de *Cysticercus bovis* au Kivu et au Ruanda-Urundi." **Bulletin de la Société de Pathologie Exotique**, **52** (4), 420–422.

Jadin & Giroud emphasize the importance of *Cysticercus bovis* as a vector of neo-rickettsial infection in man and cattle. After successful preliminary experiments with extracts of piscine tapeworms and acanthocephalans injected into rabbits, they found that a saline emulsion of cysticerci from cattle, when injected into mice and guinea-pigs, provoked the development of antibodies which gave a positive micro-agglutination reaction with antigens from cases of psittacosis, meningo-encephalitis and an exanthematous fever; whereas a muscle emulsion from the same cattle produced no such effect. They draw attention to the fact that refrigeration of meat may kill the cysticerci, but by so doing will provide the viruses with a favourable medium for multiplication.

J. M. Watson

## Evolution

See also No. 1340.

**1577**—GALLIARD, H., 1959. [Institut de Parasitologie, Faculté de Médecine de Paris.] "Filaires nouvelles du type *bancrofti-malayi* chez l'homme et l'animal dans l'aire Afrique Orientale-Océan Indien." **Bulletin de la Société de Pathologie Exotique**, **52** (5), 578–582.

Galliard discusses some of the implications of the discovery of *Wuchereria patee* in animals on Pate Island and the discovery of the microfilariae of *W. bancrofti* var. *vauceli*—now raised to specific status and given the name *W. vauceli*—in man on the east coast of Madagascar. He

concludes that the regions around the Indian Ocean have favoured the evolution of *W. malayi*, *W. pahangi* and *W. patei* and the dispersal of these "malayi-type" filariae from east Asia to the east coast of Africa. Although the adults of *W. vauceli* have not been discovered, it is believed that this worm does not stem from the "malayi-type" of filariae and, on the evidence of morphological features of the microfilariae, Galliard suggests that *W. vauceli* may be related to *Dipetalonema petteri*, a parasite of lemurs.

P. Williams

**1578**—GAMBINO, J. J., 1957. [University of California, Los Angeles, U.S.A.] "Relationships of North American Iguanidae as suggested by an analysis of their pinworm parasites, *Cyrtosomum* spp." [Abstract of paper presented at the 54th Annual Meeting of the American Society of Zoologists, August 26–29, 1957.] **Anatomical Record**, **128** (3), 553–554.

**1579**—MICHAJŁOW, W., 1959. "Ewolucyjne problemy parazytologii." **Wiadomości Parazytologiczne**, **5** (4/5), 407–427. [Also in English pp. 427–440. Discussion pp. 440–443.]  
Michajłow discusses evolutionary problems of parasitology.

N. Jones

### Miscellaneous

*No relevant abstracts in this issue*



## NEWS AND NOTES

### Study Group on Filariasis

A STUDY GROUP met in November, 1959 in Noumea, New Caledonia, under the auspices of the South Pacific Commission to consider the problem of filariasis in the South Pacific and to review the progress made in filariasis research and control since the Commission sponsored the Tahiti Conference of 1951. The group comprised: Sir Philip Manson-Bahr (U.K.), Dr. T. C. Backhouse (Australia), Dr. N. V. Bhaduri (India), Dr. I. M. Mackerras (Australia), Dr. H. de Rook (Holland), Dr. W. H. Wright (U.S.A.), and present and former officers and experts of the Commission. High commendation was given to Dr. M. O. T. Iyengar for his activities during his tour of duty with the Commission.

### Register of Helminthologists

TWO HUNDRED AND EIGHT replies have been received so far to the questionnaire form being currently issued with *Helminthological Abstracts*.

### Nematologica

HAS ADOPTED a new and attractive cover commencing with the first issue of Volume 5. The design embodies red and black lettering on a cream ground and bears a central figure of *Cylindrolaimus obtusus* Cobb in red.

### Parassitologia

WITH NUMBER 3 of VOLUME 1 *Parassitologia* became the official organ of the "Società Italiana di Parassitologia" and carries a copy of the constitution of the Society and particulars of its activities and officers. The text of two motions unanimously adopted at the meeting of the Society held in Sassari from the 22nd to 26th September, 1959 is reprinted in this

issue—the first demanding immediate action to combat the menacing situation with regard to hydatidosis in Sardinia, the second urging that in order to reduce suffering and loss due to parasitic infections of man, animals and crop plants in Italy, instruction in parasitology should be obligatory in all Faculties of medicine, veterinary science, agriculture and biological science throughout the country.

### D. O. Morgan Memorial Fund

THE MASTER AND FELLOWS of St. Catherine's College, Cambridge have formally agreed to establish an open named scholarship for undergraduates intending to read for veterinary medicine in memory of the late Dr. Daniel Owen Morgan, provided that funds are available. Donations for the fund should be sent to Dr. E. J. L. Soulsby, School of Veterinary Medicine, Madingley Road, Cambridge.

### American Society of Nematology

THE POSSIBILITY of developing an American Society of Nematology was discussed at the annual meeting of the American Institute of Biological Sciences on 1st September, 1959. A committee was appointed to investigate the situation and the results of a questionnaire issued to nematologists are now being evaluated.

### Fiftieth Anniversary of the Helminthological Society of Washington

THE SOCIETY will observe its Fiftieth Anniversary on Saturday, 8th October, 1960. A reunion will take place in the Washington area, which will comprise scientific programmes in the morning and afternoon and a banquet in the evening. Parasitologists are asked to keep this date in mind and invited to attend if possible.

## REPORTS OF MEETINGS

### American Phytopathological Society

THE NINETEENTH ANNUAL MEETING of the north-eastern division of the Society was held on November 5th and 6th, 1959, at West Springfield, Massachusetts. Among the papers presented were three dealing with plant-parasitic nematodes.

### Regional Technical Committees on Plant Parasitic Nematodes

THE ANNUAL MEETINGS of the Regional Technical Committees on plant parasitic nematodes in the United States were held during the winter months. Organization of research and attacks on specific problems were discussed.

### Institute of Biology, Parasitology Group, Spring Meeting 6th–8th April, 1960

THE 1960 SPRING MEETING of this group took place in Liverpool, most of the sessions being held in the School of Medicine. About 100 members participated. Amongst visitors from overseas were Dr. S. Šibalić and Dr. W. Ślusarski.

At the Business Meeting the results of a questionnaire which had been circulated to members were discussed and it was decided, although by no means unanimously, to remain for the time being as a group of the Institute of Biology rather than to form an entirely separate Society of Parasitologists.

Professor T. H. Davey was the invited speaker and presented a thought-provoking address on "Parasites as Enemies and Allies". Of the full papers which were read, thirteen were on helminthological topics and of these, the following were of outstanding interest: "Some applications of serological and haematological techniques to problems in parasitology" by R. J. Terry, D. Poynter and P. H. Silverman; "Some observations on experimental intercurrent nematode infections" by J. E. D. Keeling; "Further studies on the self-cure mechanism" by E. J. L. Soulsby; "Histochemical studies on a secretion in the ojector of *Thelastoma bulhoesi* (Oxyuroidea)" by D. L. Lee; and "Growth and form in a tapeworm" by C. A. Hopkins. One rather disappointing feature was the lack of papers on plant nematology—only one, on "Host parasite relations of chrysanthemum eelworm" by H. R. Wallace, being submitted.

The last afternoon session was held in the Liverpool School of Tropical Medicine and was devoted to a group of short papers and demonstrations from the Liverpool School of Tropical Medicine, and demonstrations by other members of the group. Of these, seven were of directly helminthological interest. The brief account of work in progress on "Parasitism and the intelligence and physical fitness of animals" by Professor W. E. Kershaw, R. G. A. Stretch, S. Stretch and G. W. Leytham was most stimulating.

A very successful dinner was held at the University Club, the toast to the Group and the President being ably and amusingly proposed by Professor R. M. Gordon and equally delightfully replied to by Dr. E. L. Taylor. S. Willmott

## PROGRAMMES AND PERSONNEL

### Mr. A. E. Trotman, C.M.G.

MINISTER OF NATURAL RESOURCES, Tanganyika, has been appointed Secretary to the Executive Council of the Commonwealth Agricultural Bureaux, in succession to Sir Herbert Howard. Mr. Trotman will attend the Review Conference and will take up his duties on the 1st of January, 1961.

### Mr. Walter Ives

CHIEF SCIENTIFIC LIAISON OFFICER at the Australian Scientific Liaison Office in London and member representing Australia on the Executive Council of the Commonwealth Agricultural Bureaux from 1954–1956, has been designated Executive Officer of the Commonwealth Scientific and Industrial Research Organization, Australia.

### Recent Overseas Visitors to the Bureau

INCLUDED Dr. J. A. Dinnik, East African Veterinary Research Organization; Mr. J. S. Gill, Gosh Agricultural College, Ludhiana, Punjab, India; Mr. A. M. Omidvar, Ministry of Agriculture, Tehran, Iran; Mr. A. V. Palo, Bureau of Plant Industry, Manila, The Philippines; Mr. J. A. Shepherd, Tobacco Research Board, Southern Rhodesia; Mr. P. E. Udejaja, Department of Agricultural Research, Ibadan, Federation of Nigeria; Mr. A. P. Warren, Veterinary Department, Zomba, Nyasaland; and Mr. J. R. Williams, Sugar Research Industry Institute, Mauritius.

### Dr. A. Amarasinghe

DEPUTY DIRECTOR (Animal Production and Health) and Chief Government Veterinary Surgeon in the Department of Agriculture, Peradeniya, Ceylon, has been appointed Official Correspondent for *Helminthological Abstracts* in succession to Mr. T. M. Z. Mahamooth.

### Dr. R. K. Reinecke

OF THE Division of Veterinary Services (Research), Department of Agriculture, Union of

South Africa, has been appointed Official Correspondent for *Helminthological Abstracts* in succession to Dr. R. J. Ortlepp.

### Dr. W. B. DeWitt

HAS SUCCEEDED Dr. Louis Olivier as Editor of *Tropical Medicine & Hygiene News*. Dr. DeWitt who has been at the National Institutes of Health, Laboratory of Parasitic Diseases since 1949, is well known to helminthologists for his work on nutrition in relation to experimental schistosomiasis.

### Dr. G. W. Luttermoser

OF THE National Institutes of Health, Laboratory of Parasitic Chemotherapy, recently paid a visit to Venezuela under the auspices of the Venezuelan Department of Health for the purpose of evaluating the methods of schistosomiasis control at present being employed in that country.

### Dr. D. J. Raski

OF THE Department of Nematology, University of California, Davis, California, has joined the Editorial Board of *Nematologica*. Contributors from North and South America are asked to send one script direct to Dr. Raski and one to the Secretary of the Editorial Board, Dr. P. A. van der Laan, Marterlanne 18, Bennekom, The Netherlands.

### Professor H. W. Stunkard

WELL KNOWN to helminthologists for his outstanding work on trematode life-histories has retired as Professor Emeritus from New York University. He has become a Research Associate in parasitology of the American Museum of Natural History, in which he has a laboratory. In the summer months he works at the Marine Biological Laboratory, Woods Hole, Massachusetts.



### Professor Johannes Vogel

PROFESSOR JOHANNES VOGEL, Director of the Tropical Institute in Hamburg, celebrated his 60th birthday this year. Professor Vogel, who has travelled widely in Africa and the Far East, is well known to helminthologists for his work on nematode morphology and anatomy; the biology and epidemiology of human trematode and cestode infections; the biology of schistosomes and the chemotherapy of schistosomiasis; the discovery of the "Cercarienhüllenreaktion"; immunity to helminth infections; and the separation of *Echinococcus multilocularis* from *E. granulosus*. He is a member of the editorial panel of *Zeitschrift für Tropenmedizin und Parasitologie* and *Zeitschrift für Parasitenkunde*.

### Academician K. I. Skryabin

WAS DECORATED with the order of Georgi Dimitrov during the course of a visit to Bulgaria last year at the invitation of the Bulgarian Academy of Science. Professor Skryabin, for long a leading figure in Soviet helminthology and well known not only for his massive original contributions to the subject but also for the monographic series of volumes on the major helminth groups appearing under his editorship, visited a range of scientific establishments actively engaged in parasitological work and gave several lectures.

## MOVEMENTS OF HELMINTHOLOGISTS

HELMINTHOLOGISTS are invited to notify the Editor of any change of appointment or temporary movements from their normal station on leave or for other reasons, if such movements are likely to be of interest to their fellow helminthologists. At least three months advance notice is desirable.

### Mr. R. I. Sommerville

OF THE MCMASTER ANIMAL HEALTH LABORATORY, Paramatta Road, Glebe, New South Wales, who is at present a guest worker in the Laboratory of Parasitic Diseases, National Institutes of Allergy and Infectious Diseases, United States Department of Health, Education and

Welfare, Bethesda 14, Md., U.S.A., hopes to visit the United Kingdom for four to eight weeks during the spring of 1961 for the purpose of visiting laboratories where work is being done on physiological and biochemical problems concerned with parasitism, and on free-living and plant-parasitic nematodes.

# INDEX OF AUTHORS

(The reference is to the serial number, except in the case of book reviews etc. where page numbers are given in italics. Numbers in parentheses indicate subsidiary authors in cases of joint authorship.)

	Abstract No.		Abstract No.		Abstract No.
Anon.		Cadillac, G.	(1141)	Das, V. M.	1349
991, 992, 1058, 1059, 1060, 1061,		Cairns, E. J.	(1288), 1413	Dawes, B.	1462
1062, 1063, 1064, 1065, 1066,		Canabal, E. J.	1037	Debry, G.	(1015)
1067, 1257, 1258		Canada	239	De Keyser, J.	(1188)
Abe, K.	(1309)	Capone Braga, P.	1038	Delfino, F.	1145
Ablasov, N. A.	(1355), 1445	Capron, A.	(1392), 1393	Demidov, N. V.	1146
Adams, J.	(1183)	Carlo, V. di	1556	Deouell, J.	1147
Aktan, F.	1210	Carvalho, J. C.	1311	Derde, E.	(1428)
Aleraj, Z.	(1221)	Castel, P.	1557	Deschiens, R.	1009
Alessandri, M.	(1549)	Cavier, R.	1487	Dharamat, A.	(1016)
Allen, M. W.	(1273), 1346	Celik, H.	(1210)	Diaconita, G.	1524, 1525
Alwar, V. S.	1347	Chaiporn, V.	(1016)	Diaz Muñoz, A.	1010
Alyabeva, L. L.	(1209)	Chakrabarty, M.	1191	Dickerson, G.	(1206)
Amorim, J. P.	(1408)	Chalupsky, J.	1204	Dickson, O. J.	1264
Anderson, R. C.	1446	Chang, C. M.	996	Dickson, G. R.	1160
Anteplioglu, H.	1139	Chang, C. S.	(1004), 997	Dissanaik, A. S.	1227
Antony, N. M.	1484	Chang, M.	1077	Dobbin, jr., J. E.	1431
Aoki, T.	1068	Chang, M. C.	1077	Dodin, A.	(1460)
Araki, M.	1538	Chang, N. W.	1130	Dominici, L. M.	983
Armour, J.	(1155)	Chang, P. T.	1414	Donaubauer, E.	1265
Arnau Macias, L.	1409	Chang, T. Y.	(1564)	Doren, G.	(988)
Arruda, H. V. de	(1284)	Chang, Y. C.	998, 1133	Dougherty, E. C.	1490
Asadov, S. M.	1348	Ch'ao, C. F.	1076	Drechsler, C.	1575
Ashida, H.	1539	Chao, J. H.	(1056)	Drees, H.	1266
Australia	239	Chao, Y. A.	(1124)	Drolson, P. N.	1267
Avramides, H.	(1108)	Chao, Y. S.	999	Duddington, C. L.	1320
		Charnier, M.	(1394)	Duggan, J. J.	1268
Babenskas, M.	1225	Chaudhry, A. P.	(1528)	Duma, M.	(1172)
Baca Puerta, A.	1036	Chauhan, B. S.	1244	Durrani, M. Z.	1491
Bachofer, C. S.	(1443)	Ch'en, C.	1000	Dvali, L. G.	1041
Badran, A.	(1012)	Ch'en, C. H.	1001		
Bailey, W. S.	(1259)	Ch'en, C. K.	1559	Edeson, J. F. B.	1192, 1193, 1415, 1447
Bain, D. C.	1069	Ch'en, H. L.	1078	Edgar, S. A.	1212, 1213
Baraban, H.	1555	Ch'en, J. H.	(1032)	Egerton, J. R.	1194
Barke, A.	1574	Ch'en, K. C.	1558	Egidio, M. di	1011
Baron, R. R.	(1528)	Ch'en, K. K.	(1098)	Egorov, Y. G.	1161
Barron, C. N.	993	Ch'en, S. H.	(1006), (1540), (1541)	Eldred, B.	(1328)
Baruffa, G.	(1375)	Ch'en, T. H.	1079, 1190	Emerick, R. J.	1162
Baru, V.	1518	Ch'en, W. H.	(1517)	Entner, N.	1492
Bassett, L. W.	1070	Cheng, C. L.	1002		
Basu, P. C.	(1069)	Cheng, H. C.	(1083), (1541)	Fan, P. L.	1086
Batko, B.	(1425)	Cheng, S. C.	(1540)	Fan, W. K.	(998)
Bauer, A. H.	1071	Cheng, S. H.	(1053)	Fang, T. T.	(1421)
Bauer, H.	1410	Cherry, J. K.	1080	Fathy, I.	(1402)
Beckwith, N. C.	(1095)	Chiang, P. C.	(1081), 1488	Fedorov, M.	(1430)
Becmeur	1343	Chiang, S. H.	1522	Fekete, I.	1526
Belopolskaya, M. M.	(1162)	Chibichenko, N. T.	(1355)	Felsani, F.	984
Bemrick, W. J.	1485	Chin, T. H.	1039	Fennel, III, W. E.	1463
Bénex, J.	1486	Ching, H. L.	1252	Ferrari, G.	1493
Bergeson, G. B.	(1255)	Chou, C. C.	(1007), 1081	Ferreira, M. O.	(1113)
Berkum, J. A. van	1072	Chou, H. C.	1003, 1004	Figueiredo, M. B.	1269
Berni, A.	994	Chou, T. Y.	(1121)	Fiore, S.	(1549)
Beukering, J. A. van	(983)	Christie, J. R.	(1318), 1489	Fossati, C.	1134
Bigotto, M. R.	1323, 1324	Chu, C. C.	(998)	Foster, H. H.	1312
Bikhovskaya-Pavlovskaya, I. E.	(1332), 1459	Chu, C. M.	1006	Fotadar, D. N.	1350
		Ch'ü, F. Y.	1082	Franklin, M. T.	1351, 1352
Biocca, E.	1310	Chu, P. H.	(1004)	Frazier, J. A.	(1213)
Birchfield, W.	1260	Chu, S. H.	1005, 1083, 1540, 1541	Freitas, J. F. Teixeira de	1353, 1354
Bird, A. F.	(1071)	Chu, S. S.	1007	Fuenmayor, P.	(1537)
Bischoff, A.	1519	Chuang, C. K.	1008		
Björkenheim, G.	236	Chung, H. L.	(1135)	Gadzhiev, Y. G.	1163
Blanchard, J. R.	(1161)	Chuo, C. H.	(1014)	Gagarin, V. G.	1355, 1432
Bobkova, A. F.	1226	Clark, J. J.	(1528)	Galdames, M.	(988)
Boch, J.	1430	Clark, W. C.	1326	Gall, Z.	(1187)
Bogdanov, O. P.	1325	Clayton, E. E.	(1267)	Galliard, H.	1577
Bogitsh, B. J.	(1400)	Cohoon, D. F.	(1312)	Galliechio, V.	(1331)
Boray, J. C.	1211	Coil, W. H.	1327	Gambino, J. J.	1578
Borges Ferreira, L. D.	1073	Cole, C. S.	1261	Gavez, E.	1148
Bortolotti, G.	(1015)	Condy, J. B.	1144	Gemmell, M. A.	1228, 1229, 1230
Boulangé, M.	1520	Conroy, D. A.	1040	Gerwel, C.	1527
Bourgeon, R.	(1292)	Cooper, T. V.	(1112)	Gibson, T. E.	1140, 1560
Boyce, H. R.	995	Corbett, M. K.	1262	Ginetsinskaya, T. A.	(1324)
Breslaw, L.	(1010)	Coriat, P.	(1043)	Girot, P.	(1576)
Briseño, C.	237	Coritsoglou, A. C.	1084	Goffart, H.	1270, 1271
British Veterinary Association	1441, (1442), 1521	Costa, D.	1572	Goinard, P.	1042
Broek, E. van den	1074, 1391, 1392, (1393), 1460	Coutinho-Abath, E.	1523	Goldis, G.	(1525)
Brygoo, E. R.	(1550)	Craig, G. E.	1085	Golván, Y. J.	1344, (1384)
		Crandall, R. B.	1461	Gonzalez, C.	(1492)
Buck, A. A.	1411			Gopal, S.	(1347)
Buonomini, G.	1412	Dallimore, C. E.	1263	Goplen, B. P.	1272, 1273
Burch, G. R.	1075	Das, K. K.	(1281), (1282)	Gordon, H. McL.	1400
Burgos, E.					



Abstract No.	Abstract No.	Abstract No.
Gorlin, R. J. . . . . 1528	Kelley, G. W. . . . . 1183, 1562	Lobato Paraense, W. . . . . 1405
Gorodetski, A. S. . . . . 1087	Kelsheimer, E. G. . . . . 1314	Lokhmanenko, V. A. . . . . 1234
Goss, O. M. . . . . 1274	Kerr, S. H. . . . . (1316)	Loof, P. A. A. . . . . 1364
Grabda, E. . . . . 1253	Kershaw, W. E. . . . . 1206	Lordello, L. G. E. . . . . 1283, 1284, 1365
Grabda, J. . . . . (1253)	Kessler, V. . . . . 1165	Lou, Y. T. . . . . 1101
Graham, T. W. . . . . 1275	Khalil, L. F. . . . . 1330	Lower, E. S. . . . . (1112)
Gram, A. L. . . . . (1511)	Khitenkova, L. P. . . . . (1215)	Lü, S. S. . . . . (999)
Gras, G. . . . . (1557)	Khotenovski, I. A. . . . . (1324)	Lu, S. T. . . . . 1566
Gratama, S. . . . . 1529	Kincaid, C. M. . . . . (1426)	Lybyanov, I. P. . . . . 1254
Greenlee, A. M. . . . . (1425)	Kiryanova, E. S. . . . . 1361	Lucas, A. . . . . 1222, 1223, 1224
Grigoryan, G. A. . . . . 1494	Kissel, P. . . . . 1015	Lührs, E. . . . . 1216
Groves, T. W. . . . . 1231	Kitamura, Y. . . . . (1483)	Lungu, V. . . . . 1169
Guevara, D. . . . . (1255)	Klesov, M. D. . . . . 1499	Lyndsade, J. A. . . . . 1337
Gujral, J. S. . . . . (1114)	Kloss, G. R. . . . . 1357, 1358, 1359, 1360, (1377), (1378)	McCullough, F. S. . . . . 1546
Guntz, M. . . . . (1520)	Knafel, M. E. . . . . (1087)	McFadden, S. E. . . . . 1316
Güralp, N. . . . . 1088, 1195, (1198), 1214, 1542	Kolmogorova, E. Y. . . . . 1451	McGuire, J. M. . . . . 1285
Haase, W. . . . . 1276	Konno, S. . . . . (1458)	Machado F., D. A. . . . . 1345
Halawani, A. . . . . 1012	Koonavisan, L. . . . . 1016	Machado de Mendonça, J. . . . . (1353), (1354)
Hansen, E. L. . . . . (1490)	Kovermann, B. . . . . 1151	Mackerras, M. J. . . . . 1433, 1434, 1435, 1436
Hansen, J. . . . . (1071)	Kradel, J. . . . . 1279	McQueen, R. D. . . . . 1197
Hanson, R. P. . . . . 1232	Krakaur, R. B. . . . . (1027)	Maffi, M. . . . . (993)
Hargis, jr., W. J. . . . . 1495	Krall, E. L. . . . . 1356	Magalhães, A. E. de A. . . . . 1544
Harinsuta, C. . . . . (1031)	Králavá, E. . . . . 1500	Maglajlić, E. . . . . (1148), 1545
Hayashi, S. . . . . (1116)	Kresan, A. . . . . 1184	Magun, R. . . . . (1071)
Herlich, H. . . . . 1205	Krotkiewski, A. . . . . 1017	Mai, K. . . . . 1102
Heyneman, D. . . . . (1482)	Kruidenier, F. J. . . . . 1331	Makidono, J. . . . . 1503
Higgins, R. P. . . . . (1132)	Krusberg, L. R. . . . . 1501	Mamedov, A. K. . . . . 1152
Ho, L. Y. . . . . (1135)	Ku, C. H. . . . . 1401	Manson-Bahr, P. . . . . 1103, 1104, 1105, 1386, 1468
Hobson, H. P. . . . . 1416	Kulcsár-Gergely, J. . . . . (1526)	Manson-Bahr, P. E. C. . . . . 1021
Hoekstra, W. G. . . . . (1162)	K'ung, F. Y. . . . . 1362	Mao, Y. C. . . . . 1022
Hollanda, H. H. de . . . . . (1572)	Kung, S. H. . . . . 1094	Maria, B. de . . . . . 1106
Holloway, H. L. . . . . 1245	Kurokawa, K. . . . . 1196	Markov, G. S. . . . . (1430)
Holz, J. . . . . 1448	Labruyère, R. E. . . . . 1280	Marsh, C. L. . . . . (1562)
Hopkins, C. A. . . . . 1464	Lafferre, M. . . . . 1095	Martin, C. A. . . . . 1235
Hou, T. C. . . . . 1135	Lagrot, F. . . . . 1043	Marwah, S. N. . . . . 1136
Hovorka, J. . . . . 1149	Lahbabi, H. . . . . 1044	Massla, P. . . . . 1107
Howard, H. W. . . . . (1261)	Laing, A. B. G. . . . . (1193)	Massi, O. . . . . (1072)
Hoyos, F. G. . . . . 1277	Lall, B. S. . . . . 1281, 1282	Matsuda, K. . . . . 1540
Hsieh, C. L. . . . . (1118)	Lamy, L. . . . . (1009), (1485)	Mauritius . . . . . 240
Hsin, T. Y. . . . . (1004)	Landau, M. . . . . 1166	Medrado, J. . . . . (1549)
Hsu, L. Y. . . . . 1013, 1417	Lang, C. C. . . . . (1417)	Mello, L. M. de . . . . . (1283)
Hsu, T. C. . . . . 1014	Lanoix, J. N. . . . . 1018	Mera S., O. . . . . 1286
Hsu, W. N. . . . . 1089	Larivière, M. . . . . 1394	Merdivenci, A. . . . . 1236, 1237
Hu, H. S. . . . . 1090	Laroche, M. . . . . (1222), (1223), (1224)	Merle, A. . . . . 1238
Huang, F. M. . . . . (1003)	Latif, N. . . . . 1402	Mettrick, D. F. . . . . 1338, 1339
Hughhins, E. J. . . . . 1246	Laurence, B. R. . . . . 1466	Michael, K. P. . . . . 1108
Humble, A. E. . . . . 1233	Lautz, W. . . . . 1315	Michajłow, W. . . . . 1579
Hunter, W. S. . . . . 1132	Lavrov, O. B. . . . . 1167	Michard, V. . . . . (1207)
Hutton, R. F. . . . . 1328	Lebailly, J. . . . . 1141	Micheloni, F. . . . . (983)
Iida, M. . . . . 1561	Le Breton Oliveau, G. . . . . (1122)	Michon, P. . . . . 1047
Ikeshoji, T. . . . . (1116)	Lee, C. L. . . . . 1530	Mikailov, T. K. . . . . 1249, 1250
Iles, C. . . . . 1329	Lee, R. P. . . . . (1155)	Mikhailova, O. D. . . . . (1111)
Inamura, Y. . . . . 1449	Lefrou, G. . . . . 1207	Miller, G. C. . . . . 1452
India . . . . . 239	Lei, H. H. . . . . 1531	Miller, J. H. . . . . 1469
Ishikawa, M. . . . . 1450	Leite, G. . . . . 986, 1019	Mimioğlu, M. . . . . 1198, 1199
Isobe, C. . . . . 1182	Letac, R. . . . . (1025)	Minton, N. A. . . . . 1287, 1288
Ivanova, M. G. . . . . (1111)	Levine, N. D. . . . . 1563	Mirzaev, T. . . . . 1170
Ivanova, Z. I. . . . . 1215	Lewis, D. J. . . . . 1419	Misochkin, A. . . . . 1567
Ivashkin, V. M. . . . . 1385	Leytham, G. W. H. . . . . (1206)	Miyazawa, M. . . . . 1453
Izyumova, N. A. . . . . 1247, 1496	Li, B. T. . . . . 1467	Monteoliva, M. . . . . (1487)
Jacob, G. F. . . . . 1091	Li, C. C. . . . . (1566)	Moore, A. . . . . 1289
Jadin, J. . . . . 1576	Li, C. T. . . . . (1119)	Moore, B. . . . . (1399)
Jain, S. L. . . . . 1248, 1322	Li, L. S. . . . . 1096	Moore, E. L. . . . . (1267)
Jamaica . . . . . 239	Li, P. C. . . . . (1020)	Moreno, A. F. . . . . 1290
Jampolsky, R. . . . . (1523)	Li, T. Y. . . . . 1020	Moretti, G. . . . . 1023
Jansen, jr., J. . . . . (1441), (1442), 1465	Lien, M. C. . . . . 1564	Mountain, W. B. . . . . 1291, 1292, 1533
Janssens, P. G. . . . . 1092	Lien, S. H. . . . . 1097, 1420	Mussini-Montpellier, J. . . . . (1520)
Jarman, M. . . . . 1497	Lienert, E. . . . . 1565	Muth, O. H. . . . . 1568
Jayasuriya, D. J. C. . . . . (1227)	Likhovoz, L. K. . . . . 1168	Mutovin, V. I. . . . . 1185
Jeffery, G. M. . . . . 985	Lillo, F. de . . . . . 1045	Mygind, H. . . . . 1293
Jérôme, M. . . . . (1015)	Lin, C. L. . . . . (1517)	Nagaty, H. F. . . . . 987
John, L. . . . . (1100), (1102)	Lin, C. L. . . . . 1098	Nagy, P. . . . . (1524), (1525)
Johnson, L. F. . . . . 1313	Lin, S. S. . . . . 1543, 1551	Nakai, T. . . . . (1127)
Johri, G. N. . . . . 1336	Lin, Y. C. . . . . (1098)	Nakase, M. . . . . 1387, 1388, 1389
Jones, F. G. W. . . . . 1278, 1418, 1498	Linsell, C. A. . . . . (1021)	Neghme, A. . . . . 988
Jones, T. C. . . . . (237)	Lipková, V. . . . . 1502	Nelson, G. S. . . . . 1024
Jopling, W. H. . . . . 1093	Lipparoni, E. . . . . 1363	Nétik, J. . . . . 1025
Jordan, R. . . . . (1202)	Liu, C. C. . . . . (1564)	Nettel, F., R. . . . . 1109
Kabaev, D. K. . . . . (1176)	Liu, H. S. . . . . (1006)	Nicoli, R. M. . . . . 1384
Kageruka, P. . . . . (1188)	Liu, H. Y. . . . . 1099	Nielsen, L. W. . . . . 1317
Kamida, K. . . . . (1127)	Liu, K. . . . . (1532)	Nikitishin, P. K. . . . . 1186
Karlović, M. . . . . 1221	Liu, K. N. . . . . (1034)	Nivaldo, J. . . . . 1110
Karlyuk, A. . . . . 1150	Liu, S. H. . . . . 1403, 1404	Noda, K. . . . . 1470
Kates, K. C. . . . . 1164	Liu, T. S. . . . . 1421	Norman, L. . . . . 1547
Kerasawa, K. . . . . (1305), (1306)	Liu, W. M. . . . . 1046	Normanha, E. S. . . . . 1294
	Liu, Y. F. . . . . 1532	
	Liu, Y. K. . . . . 1100	



	Abstract No.		Abstract No.		Abstract No.
Northern Ireland . . . . .	240	Sadikhov, I. A. . . . .	1203, 1239	Threlkeld, W. L. . . . .	(1426)
Noskov, A. I. . . . .	(1185)	Sadun, E. H. . . . .	(1543), (1547), 1550, 1551	Tiktin, N. V. . . . .	1307
Note, D. . . . .	1048	Šafránek, V. . . . .	(1500)	Timm, R. W. . . . .	1376
Nusbaum, C. J. . . . .	1295, (1298)	Sandeman, I. M. . . . .	1341, 1342	Tokobaev, M. M. . . . .	(1432)
Nutter, G. C. . . . .	1318	Sasa, M. . . . .	1116	Tolosa, E. . . . .	1537
Ogren, R. E. . . . .	1471, 1472	Sasser, J. N. . . . .	(1317)	Trach, V. N. . . . .	1181
Ohbayashi, M. . . . .	(1458), (1483)	Sato, K. . . . .	(1116)	Travassos, H. . . . .	1251
Okugi, M. . . . .	(1483)	Savchenko, M. E. . . . .	1218	Tredre, R. F. . . . .	1377, 1378
Ollerenshaw, C. B. . . . .	1505	Savel, J. . . . .	(1487)	Trofimov, V. P. . . . .	1033
Olsen, L. S. . . . .	(1183)	Sawada, I. . . . .	1476	Ts'ao, M. K. . . . .	1209
Olson, L. J. . . . .	1548	Sayin, F. . . . .	(1198), (1199)	Tsu, P. L. . . . .	119
Olteanu, G. . . . .	1171	Schiller, E. L. . . . .	1455	Tuan, F. L. . . . .	1053
Oostenbrink, M. . . . .	(1352)	Schmid, M. . . . .	1156	Tuan, S. C. . . . .	(1100)
Osche, G. . . . .	1474	Schmidt-Hoensdorf, F. . . . .	1178	Tung, K. H. . . . .	(1100)
Oshanova, N. . . . .	1367	Seaton, D. R. . . . .	1137	T'ung, S. F. . . . .	1054
Oshmarin, P. G. . . . .	1049	Seidel, G. K. . . . .	1240	T'ung, S. T. . . . .	1121
Osimani, J. J. . . . .	(236)	Seinhorst, J. W. . . . .	237, (1280), 1302, 1422	Turančić, V. . . . .	(1545)
Ostvold, H. . . . .	(1309)	Seneviratna, P. . . . .	(1347), 1369	Turner, H. F. . . . .	1481
Otsubo, K. . . . .	(1280)	Shcherbatyuk, V. I. . . . .	1176	Turner, H. N. . . . .	(1174)
Ouden, H. den . . . . .	1506	Shcherbinin, I. V. . . . .	1177	Turner, J. H. . . . .	(1164)
Overgaard Nielson, C. . . . .	1319	Shen, C. H. . . . .	(1540), (1541)	Vandervelden, M. . . . .	(1188)
Overman, A. J. . . . .	(1545)	Shen, H. Y. . . . .	(1056)	Van Pelt, H. M. . . . .	(1310)
Ožegović, L. . . . .	1111	Shen, S. S. . . . .	1370, (1382)	Varazanashvili, M. S. . . . .	1158
Ozeretskovskaya, N. N. . . . .	1332	Shen, W. X. . . . .	1477	Varges, W. . . . .	1159
Paggi, L. . . . .	1443	Shen, Y. P. . . . .	1028	Vasilkov, G. V. . . . .	1243
Pahl, G. . . . .	1112	Shepherd, A. M. . . . .	1303	Vaughn, J. . . . .	1202
Paine, D. H. D. . . . .	(1513)	Shoho, C. . . . .	(1017), 1117	Vegte, F. A. van der . . . . .	1427
Panaïtesco, D. . . . .	(1048)	Sicinski, A. . . . .	1371	Vellieux, M. . . . .	1122
Pantini, J. P. . . . .	1333	Siddiqi, M. R. . . . .	1372	Vercruysee, R. . . . .	1428
Pao, T. C. . . . .	1454	Siegmund, O. . . . .	1219	Verdieu, G. Y. . . . .	105
Paperna, I. . . . .	1296	Silva, R. . . . .	(988)	Verneil, C. . . . .	1398
Paramonov, A. A. . . . .	1172	Silva Junior, M. . . . .	1423	Veselova, T. P. . . . .	(1146)
Parnell, I. W. . . . .	1200	Simonetti, N. . . . .	1051	Vickers, C. L. . . . .	1189
Patnaik, B. . . . .	1406, 1407	Singh, M. V. . . . .	(1114)	Villages Canevaro, O. . . . .	990
Paulini, E. . . . .	(1400)	Sinha, P. K. . . . .	(1191)	Voge, M. . . . .	1482, 1515
Pearson, I. G. . . . .	(1042)	s'Jacob, J. . . . .	1255	Vorobev, M. M. . . . .	1220
Pegullo, J. . . . .	1475	Skalinski, E. I. . . . .	1535, 1536	Vuković, V. . . . .	1143
Pemberton, R. T. . . . .	(1124)	Slack, D. A. . . . .	(1264), (1285)		
P'eng, Y. F. . . . .	(1405)	Sledge, E. B. . . . .	1512	Wagner, E. D. . . . .	1399, 1429
Pereira, O. . . . .	1395	Sleman, H. K. . . . .	1552	Wahid, S. . . . .	1479
Perlowagora-Szumlewicz, A. . . . .	1131	Smith, A. L. . . . .	1304	Wallace, H. R. . . . .	1516
Pessah, S. D. . . . .	989, 1408	Smith, H. A. . . . .	237	Walters, H. J. . . . .	(1285)
Pessoa, S. B. . . . .	(1466)	Smithers, S. R. . . . .	1424, 1553	Walton, B. C. . . . .	(1550)
Petter, F. R. N. . . . .	1366	So, N. . . . .	1554	Wang, C. F. . . . .	1517
Petukhov, M. I. . . . .	(1450)	Sobrero, E. . . . .	1478	Wang, C. Y. . . . .	(1090), 1123, 1124
Pezenburg, E. . . . .	(1448)	Sogandares-Bernal, F. . . . .	(1328)	Wang, H. C. . . . .	(1124)
Phillips, P. H. . . . .	(1162)	Soh, C. T. . . . .	1569, 1570	Wang, H. K. . . . .	1125
Pietri, H. . . . .	(1520)	Sommerville, R. I. . . . .	1373	Wang, S. H. . . . .	1034
Pineda, F. . . . .	1297	Soresco, A. . . . .	1513	Wang, T. H. . . . .	(1020)
Piotrowski, Z. . . . .	(1017)	Southcott, W. H. . . . .	(1174)	Wantland, W. W. . . . .	1138
Piva, F. . . . .	(983)	Spedding, C. R. W. . . . .	1241	Waseem, M. . . . .	1398
Podlesni, G. V. . . . .	1153	Srivastava, J. S. . . . .	(1142)	Watson, J. M. . . . .	237
Pope, A. L. . . . .	(1162)	Ssut'u, H. M. . . . .	1029	Wehrli, A. . . . .	1321
Popova, Z. G. . . . .	(1499), 1507	Stanford, E. H. . . . .	(1272), (1273)	Wei, J. L. . . . .	1056
Powell, N. T. . . . .	1298	Stanley, N. C. J. . . . .	1514	Weng, H. C. . . . .	(1135)
Prata, A. . . . .	1549	Stefanski, W. . . . .	1397	Wensvoort, P. . . . .	(1521)
Prokopić, J. . . . .	1437, 1438, 1439	Stelter, H. . . . .	(1444)	Werner, A. . . . .	1057
Prost, M. . . . .	1508	Stepanov, I. A. . . . .	1179	White, P. L. . . . .	1126
Rachou, R. G. . . . .	1113	Steshenko, V. M. . . . .	(1432)	Whitehead, A. G. . . . .	1380
Rahman, J. . . . .	1114	Su, T. F. . . . .	1030, (1086)	Wieser, W. . . . .	1256
Rai, P. . . . .	1142	Suessenguth, H. . . . .	1425	Williams, J. R. . . . .	1381
Ramakrishna, G. . . . .	(1244)	Suic, M. . . . .	1052	Williams, P. . . . .	1390
Ramirez M., A. . . . .	1173	Sumption, L. . . . .	(1183)	Wilson, G. I. . . . .	(1164)
Rao, P. N. . . . .	1368	Sun, C. C. . . . .	1118	Winstead, N. N. . . . .	(1301)
Rao, S. B. V. . . . .	1217	Suwanik, R. . . . .	1031	Wirtz, W. . . . .	(1266)
Rausch, R. . . . .	1340, 1440	Suzuki, K. . . . .	(1483)	Wong Chi, L. . . . .	(1429)
Reyes, M. L. . . . .	1300	Świerstra, D. . . . .	1441, 1442	Wootton, D. M. . . . .	1334
Rhoades, H. L. . . . .	1509	Świetlikowski, M. . . . .	1157	Wu, C. . . . .	1457
Ribeiro, H. de P. . . . .	1026	Szanto, J. . . . .	(1563)	Wu, C. F. . . . .	(1081)
Ribelin, W. E. . . . .	1534	Szidat, L. . . . .	1479	Wu, S. C. . . . .	(1370), 1382, (1383)
Ricciardi, M. L. . . . .	(1411)	Takahashi, S. . . . .	(1503)	Wu, Y. H. . . . .	(1007)
Richert, J. H. . . . .	1027	Tamura, I. . . . .	1305, 1306	Wu, Y. M. . . . .	(1421)
Richter, S. . . . .	(1221)	Tanaka, H. . . . .	(1116)	Wu, Y. S. . . . .	1035
Rifaat, M. A. . . . .	(987)	T'ang, S. T. . . . .	1032	Yamaguma, J. . . . .	(1127)
Riggs, R. D. . . . .	1301	Taylor, A. E. R. . . . .	1456, 1571	Yamashita, K. . . . .	1458, 1483
Rit, J. . . . .	(1122)	Taylor, A. L. . . . .	1374	Yamato, A. . . . .	1127
Rizhikov, K. M. . . . .	(1323), (1324)	Taylor, E. L. . . . .	1242	Yang, F. H. . . . .	1335
Robinson, H. A. . . . .	1208	Taylor, J. C. . . . .	1426	Yeh, Y. P. . . . .	1128
Roe, R. . . . .	1174	Teng, C. F. . . . .	(1077)	Yen, C. K. . . . .	(1531)
Rook, H. de . . . . .	1115	Teng, C. L. . . . .	(1532)	Yen, W. C. . . . .	(1370), (1382), 1383
Rose, J. H. . . . .	1154, 1175, 1510	Tenora, F. . . . .	1375	Yen, Y. . . . .	(1102)
Ross, J. G. . . . .	1155	Terry, R. J. . . . .	(1571)	Yokoo, T. . . . .	1309
Rossi-Espagnet, A. . . . .	(1106)	Thienpont, D. . . . .	1188	Yü, T. H. . . . .	(1086), 1129
Rothacker, D. . . . .	1299, 1444	Thomas, R. E. . . . .	1201	Yuan, C. W. . . . .	(1001)
Rothwell, T. L. W. . . . .	(1194)	Thomas, R. J. . . . .	1180, 1480		
Rowan, W. B. . . . .	1396, 1511	Thomson, B. J. . . . .	(1400)	Zakaria, H. . . . .	1573
Rukavina, J. . . . .	1187	Thorne, G. . . . .	(1352)	Zamith, A. P. L. . . . .	(1284), (1365)



# OFFICIAL CORRESPONDENTS OF THE COMMONWEALTH BUREAU OF HELMINTHOLOGY

## *Aden Protectorate:*

VETERINARY OFFICER, P.O. Box 1161, Aden Protectorate.

## *Australia:*

HUGH McL. GORDON, B.V.Sc., McMaster Animal Health Laboratory, C.S.I.R.O., Glebe, Sydney, N.S.W.

## *Bahamas:*

DIRECTOR OF AGRICULTURE, Dept. of Agriculture & Marine Products, P.O. Box 28, Nassau.

## *Barbados:*

SENIOR VETERINARY OFFICER, Dept. of Science & Agriculture, P.O. Box 505, Bridgetown.

## *Basutoland:*

DIRECTOR OF LIVESTOCK & AGRICULTURAL SERVICES, P.O. Box 24, Maseru.

## *Bechuanaland:*

THE DIRECTOR OF AGRICULTURE, Mahalapye.

## *Bermuda:*

DIRECTOR OF AGRICULTURE, Dept. of Agriculture, Paget East.

## *British Guiana:*

THE ENTOMOLOGIST, Dept. of Agriculture, Georgetown.

## *British Honduras:*

VETERINARY OFFICER, Dept. of Agriculture, Central Farm, Belize.

## *British Solomon Islands:*

SENIOR AGRICULTURAL OFFICER, Dept. of Agriculture, Honiara.

## *Brunei:*

STATE AGRICULTURAL OFFICER, Brunei.

## *Canada:*

T. W. M. CAMERON, T.D., M.A., D.Sc., M.R.C.V.S., Macdonald College, Quebec.

## *Ceylon:*

A. AMARASINGHE, Ph.D., M.Sc., M.P.H., Deputy Director, (Animal Production and Health), Dept. of Agriculture, Peradeniya.

## *Cyprus:*

CHIEF OFFICER, Veterinary Service, Dept. of Agriculture, Nicosia.

## *Federation of Malaya:*

DIRECTOR, Veterinary Services, Kuala Lumpur.

## *Fiji:*

CHIEF VETERINARY OFFICER, Suva.

## *Gambia:*

PRINCIPAL VETERINARY OFFICER, Veterinary Headquarters, Abuko.

## *Ghana:*

CHIEF VETERINARY OFFICER, Ministry of Agriculture, P.O. Box M 37, Accra.

## *Hong Kong:*

DIRECTOR OF AGRICULTURE, Fisheries & Forestry, Dept. of Agriculture, Hong Kong.

## *India:*

H. D. SRIVASTAVA, M.Sc., D.Sc., Indian Veterinary Research Institute, Izatnagar, United Provinces.

## *Jamaica:*

TECHNICAL OFFICER (CROPS & SOIL), Kingston.

## *Kenya:*

CHIEF VETERINARY RESEARCH OFFICER, Kabete.

## *Leeward Islands:*

*Antigua:* DIRECTOR OF AGRICULTURE, Friars Hill.

*Montserrat:* AGRICULTURAL SUPERINTENDENT, The Grove.

*St. Kitts-Nevis-Anguilla:* DIRECTOR OF AGRICULTURE, Department of Agriculture.

*Virgin Islands:* SUPERINTENDENT OF AGRICULTURE, Agricultural Dept., Tortola.

## *Malta:*

DIRECTOR OF AGRICULTURE, Dept. of Agriculture, 53, Archbishop Street, Valletta.

## *Mauritius:*

SENIOR VETERINARY OFFICER, Dept. of Agriculture, Reduit.

## *New Zealand:*

L. K. WHITTEN, B.V.Sc., Wallaceville Animal Research Station, Wellington.

## *Nigeria:*

*Federal Government:* DIRECTOR OF VETERINARY RESEARCH, Veterinary Research Laboratories, Vom.

*Western Region:* CHIEF LIVESTOCK OFFICER, Ministry of Agriculture & Natural Resources, Private Mail Bag 5007, Ibadan.

## *North Borneo:*

VETERINARY OFFICER, Jesselton.

## *Northern Rhodesia:*

DIRECTOR OF VETERINARY SERVICES, P.O. Box 50, Mazabuka.

## *Nyasaland:*

DIRECTOR OF VETERINARY SERVICES, P.O. Box 90, Zomba.

## *Pakistan:*

A. R. RANJHA, M.Sc., D.Sc., Zoological Survey Department, Isfahani Building, McLeod Road, Karachi.

## *Republic of Ireland:*

F. ST. GEORGE SLEITH, M.A., M.R.C.V.S., Veterinary College of Ireland, Ballsbridge, Dublin.

## *Republic of the Sudan:*

A. D. HANNA, B.Sc. (Lond.), A.R.C.S., D.I.C., Ph.D. (Lond.) Chief, Agricultural Research Division, Ministry of Agriculture, Wad Medani.

## *St. Helena:*

AGRICULTURAL & FORESTRY OFFICER, Dept. of Agricultural & Forestry, Scotland.

## *Sarawak:*

DIRECTOR OF AGRICULTURE, Dept. of Agriculture, Kuching.

## *Seychelles:*

DIRECTOR OF AGRICULTURE, Dept. of Agriculture, Victoria, Mahé.

## *Sierra Leone:*

DIRECTOR OF VETERINARY SERVICES, Teko, via Makeni.

## *Somaliland Protectorate:*

DIRECTOR, Dept. of Natural Resources, P.O. Box 9, Hargeisa.

## *Southern Cameroons:*

PRINCIPAL VETERINARY OFFICER, Veterinary Dept., Bamenda.

## *Southern Rhodesia:*

DIRECTOR, J. A. WHELLAN, B.Sc., F.R.E.S., Chief Entomologist, Dept. of Research & Specialist Services, P.O. Box 8100, Causeway.

## *Swaziland:*

PRINCIPAL VETERINARY OFFICER, P.O. Box 30, Bremersdorp.

## *Tanganyika:*

CHIEF VETERINARY RESEARCH OFFICER, c/o. Veterinary Dept., Dar-es-Salaam.

## *Trinidad:*

TECHNICAL OFFICER (ANIMAL HUSBANDRY), Dept. of Agriculture, St. Clair, Port of Spain.

## *Uganda:*

1. SENIOR ENTOMOLOGIST, Kawanda.
2. CHIEF RESEARCH OFFICER, Animal Health Research Centre, P.O. Box 24, Entebbe.

## *Union of South Africa:*

R. K. REINECKE, B.V.Sc., Division of Veterinary Services, Dept. of Agriculture, P.O. Onderstepoort, Pretoria.

## *Windward Islands:*

*Dominica:* AGRICULTURAL SUPERINTENDENT, Dept. of Agriculture, Roseau.

*Grenada:* SUPERINTENDENT OF AGRICULTURE, Dept. of Agriculture, St. Georges.

*St. Lucia:* AGRICULTURAL SUPERINTENDENT, Dept. of Agriculture, Castries.

*St. Vincent:* SUPERINTENDENT OF AGRICULTURE, Dept. of Agriculture, Kingstown.

## *Zanzibar:*

DIRECTOR OF AGRICULTURE, Dept. of Agriculture, P.O. Box 159, Zanzibar.

## FAO CORRESPONDENT

DR. N. R. REID, Animal Health Branch, FAO, Rome, Italy.



## NOTICE TO LIBRARIANS AND SUBSCRIBERS

From Volume 29, which is being issued during 1960, each volume of *Helminthological Abstracts* will consist of four quarterly parts appearing in March, June, September and December. Each part includes abstracts of all papers which come to hand during the relevant period of preparation, regardless of their date of publication; and is provided with author indices only. The title page, author and subject indices for the complete volume are issued in March of the following year.

The earlier arrangement by which abstracts of the literature published in each year were brought into a single volume when bound terminates with the completion of Volume 27 (1958).

Volume 28 contains abstracts of such literature published in 1959 as came to hand before September of that year; together with titles (without abstracts) of all helminthological books and articles which came to the attention of the Bureau too late for inclusion in the relevant annual volume under the old scheme.

Correspondence regarding subscriptions and orders should be addressed to:

Commonwealth Agricultural Bureaux,  
Central Sales Branch,  
Farnham House, Farnham Royal,  
Bucks, England.

Correspondence on scientific matters should be addressed to:

The Director,  
Commonwealth Bureau of Helminthology,  
The White House, 103 St. Peter's Street,  
St. Albans, Herts,  
England.

### \* A SHORT SYNOPSIS OF HUMAN PROTOZOOLOGY AND HELMINTHOLOGY

By

L. R. S. MacFARLANE,  
O.B.E., M.D., M.A., D.P.H.

260 pages, 183 illustrations  
35s.

Published by

E. & S. LIVINGSTONE, LTD.  
Teviot Place, Edinburgh 1

### ADVERTISEMENTS

*Helminthological Abstracts* has a world-wide circulation in the medical, veterinary, agricultural and zoological fields, both among research workers and practitioners. It therefore reaches a very wide circle of readers concerned with practical aspects of treatment and control of helminth infections in man and domestic animals and eelworm infestation of plants, as well as pure research workers. Each quarterly issue carries a number of advertisement pages.

For details and rates please write to: Cowlshaw & Lawrence (Advertising) Ltd., 14-16 Ludgate Hill, London, E.C.4.